

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

MIDWAY MFG. CO.,
an Illinois corporation,

Plaintiff,

vs.

NORTH AMERICAN PHILIPS
CONSUMER ELECTRONICS CORP.,
a Tennessee corporation, and

PARK TELEVISION d/b/a
PARK MAGNAVOX HOME
ENTERTAINMENT CENTER,
an Illinois partnership, and

ED AVERETT,
an individual,

Defendants.

Civil Action No. 81 C 6434

The Honorable

George N. Leighton

JURY DEMANDED

DOCKETED
JAN 31 1984

FILED
JAN 27 1984

Judge George N. Leighton
U. S. District Court

NOTICE OF MOTION

To: James H. Alesia, Esq.
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Please take notice that on January 27, 1984 in the Courtroom of the Honorable George N. Leighton at 9:00 a.m., or as soon thereafter as counsel may be heard, Plaintiff Midway Mfg. Co. will present its MOTION FOR LEAVE TO TAKE DEPOSITION.

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241

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FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

MIDWAY MFG. CO., an
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Plaintiff,

vs.

NORTH AMERICAN PHILIPS CONSUMER
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Judge George N. Leighton
U. S. District Court

MOTION FOR LEAVE TO TAKE DEPOSITION

Plaintiff Midway Mfg. Co. ("Midway") moves this Court for leave to take the deposition of Christopher Kirby, a third-party witness, for the purpose of presenting evidence to the Court at the trial of this cause.

1. Mr. Christopher Kirby, the author of the report entitled "Bernstein Research-The Video Game Industry", attached hereto as Exhibit A, is a third-party witness whose deposition is sought by Midway.
2. Mr. Kirby will be unavailable to testify at trial due to prior business commitments.

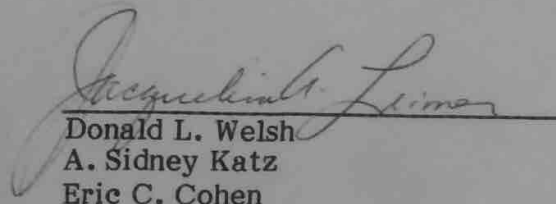
3. Further, Mr. Kirby's place of business is located in the state of New York. Presumably he is a resident of that state, and therefore is not subject to the subpoena powers of this Court.

4. This deposition is not for the purpose of discovery but for the purpose of presenting evidence to this Court.

5. Further, the deposition of Mr. Kirby will not be necessary if defendants will stipulate to the admissibility at trial of the report attached hereto as Exhibit A.

6. While Midway recognizes that discovery has been closed, this is an evidentiary deposition and Midway respectfully states that, due to the circumstances set forth herein, leave should be granted to take the deposition sought, unless a stipulation is obtained, in order to fully present its case at trial on the merits.

Respectfully submitted,



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CERTIFICATE OF SERVICE

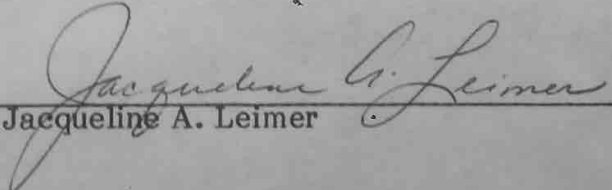
I hereby certify that copies of the foregoing NOTICE OF MOTION and MOTION FOR LEAVE TO TAKE DEPOSITION have been served, by hand delivering a copy to

James H. Alesia
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19 South LaSalle Street
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and

Theodore W. Anderson
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Chicago, Illinois 60602

on this 25th day of January, 1984.


Jacqueline A. Leimer



THE VIDEO GAME INDUSTRY

STRATEGIC ANALYSIS

Domestic Earnings To Erode Sharply
After 1981 Peak, But Partially Offset
by Strong Growth Overseas

Coin-Operated Segment Expected To Show
Only Moderate Long-Term Growth

Warner Expected To Show 1981-2007 Earnings
Growth, Longer Term Despite Near-Term
Earnings Pressure

Colco To Expand Share and Earnings
Near Term, But Longer-Term Prospects
Unclear

Atari Expected Further Share Erosion
And Flat Earnings At Best

Bally Will Continue To Lead the
Coin-Operated Market Segment.
Earnings Growth To Come from
Amusement and Public Lottery Businesses

PLAINTIFF'S
EXHIBIT

PENCAD-Bayonne, N. J.

A

DECEMBER 1982

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December 28, 1982

Christopher D. Kirby

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TABLE 1
Current Industry Earnings Estimates
Major Video Game Companies

	<u>WCI</u> <u>(\$ 31)</u>	<u>CLO¹</u> <u>(\$ 35)</u>	<u>MAT</u> <u>(\$ 17)²</u>	<u>BLY</u> <u>(\$ 23)</u>	<u>S&P 400</u> <u>(\$ 158)</u>
Earnings Per Share					
1977	\$ 1.31	\$ 0.12	\$ 1.56	\$ 0.81	\$ 11.54
1980	2.38	1.17	0.12	1.97	16.11
1981	3.57	0.51	1.55	3.03	16.75
1982E	4.00	2.70	2.40	3.40	14.50
1983E	4.50	3.60	2.75	3.75	18.85
1986E	7.80	4.05	2.55	6.75	30.00
Growth Rate					
1977-1982E	25.0%	86.4%	9.0%	33.2%	4.7%
1982E-1986E	18.2	10.7	1.5	18.7	20.0
Dividends Per Share					
1977	\$ 0.23	\$ -	\$ -	\$ 0.03	\$ 4.95
1980	0.54	-	0.30	0.10	6.49
1981	0.76	-	0.30	0.10	7.01
1982E	1.00	-	0.30	0.18	7.00
1983E	1.00	-	0.30	0.20	7.70
1986E	2.00	-	0.30	0.35	10.80
Growth Rate					
1977-1982E	34.2%	- %	N/M	43.1%	7.2%
1982E-1986E	18.9	-	- %	18.1	11.5
Profitability 1982E					
Return on Investment	18.0%	76.3%	20.9%	19.5%	- %
+ Contribution from Leverage	4.6	11.1	4.9	6.8	-
= Return on Equity	22.6%	87.4%	25.8%	26.3%	16.0%
x Retention Rate	75.0	100.0	83.0	94.7	60.9
= Reinvestment Rate	17.0%	87.4%	21.6%	24.9%	9.9%
Valuation					
Price/Earnings 1982E	7.8x	6.5x	7.1x	6.8x	10.9x
Price/Earnings 1983E	6.9x	5.0x	6.2x	6.1x	8.4x
Yield 1983E	3.2%	0.0%	1.8%	0.9%	4.9%
Relative Valuation 1983E					
Price/Earnings % Group	114%	83%	103%	101%	- %
Price/Earnings % S&P 400	82	60	74	73	100
Expected Total Rate of Return³	19.0%	12.6%	11.3%	16.8%	15.9%

1 - CLO E.P.S. restated for 2-for-1 stock split in January 1983; price is on a pre-split basis.

2 - Fiscal year ends January 31 of following year.

3 - Based on three-phase dividend discount model.

Source: Corporate reports and Bernstein estimates.

(1/RR)

THE VIDEO GAME INDUSTRY

Significant Research Conclusions

- 1) We expect 1983 to be the last year of growth in the domestic video game market. Although household penetration will continue through 1986, reaching 30% or higher in that year, industry earnings are expected to slide sharply after next year as revenue growth slows to a 2% average annual pace and margin pressure intensifies in both hardware and software categories, as the following table indicates:

	<u>Mfr. Domestic Consumer Video Game Sales</u> (\$ mil.)			<u>Ann. Comp.</u> <u>Growth Rate</u> <u>1983E-86E</u>
	<u>1982</u>	<u>1983E</u>	<u>1986E</u>	
Cartridges	\$1,175.0	\$1,425.0	\$1,440.0	0%
Consoles	977.0	965.0	575.0	(16)
Computer Game Software	115.0	262.5	810.0	46
Total	\$2,267.0	\$2,652.5	\$2,825.0	2%

Source: Bernstein estimates.

- 2) The erosion of domestic market profitability will stem from three sources: (a) maturation of the primary market (the upper income family), which will force manufacturers to downgrade price in order to penetrate other market segments, (b) intensified competition, which will result in heavier marketing and promotional expenditures, and (c) declining consumption of higher margin cartridges, as new console owners (who buy cartridges at higher rates) decline in proportion to the total installed base. Average price and margin trends are shown in the following table:

	<u>Average Mfr. Price and Gross Margins, by Product Category</u>			<u>Ann. Comp.</u> <u>Growth Rate</u> <u>1983-86E</u>
	<u>Average Manufacturer Price</u>			
	<u>1982</u>	<u>1983E</u>	<u>1986E</u>	
Cartridges/Software	\$16.00	\$14.40	\$12.00	(6)
Consoles	\$123.00	\$110.00	\$81.00	(10)

	<u>Gross margins</u>			<u>Ann. Comp.</u> <u>% Change</u> <u>1983-86E</u>
	<u>1982</u>	<u>1983E</u>	<u>1986E</u>	
Cartridges/Software	50%	45%	35%	(10)%
Consoles	35%	32%	20%	(12)%

Source: Bernstein estimates.

Consoles, which have heretofore generated nearly half of the total game profits of the major industry participants, are expected to show a precipitous drop in their earnings contribution by 1986, to 20% or less of total game product earnings.

- 3) Strong growth overseas should provide a substantial offset to the slowing domestic market. International game revenues are expected to grow at a 36% annual rate between 1982 and 1986, from \$400 million to \$1.4 billion, for 40% of total game-dedicated sales in 1986. Although competition is unlikely to reach the domestic pitch, difficulties in penetrating many disaggregated markets could hold profit margins to the U.S. level in the 1984-86 time frame. Market shares will be somewhat less concentrated than in the U.S.; Atari is expected to prevail, but by a lesser margin, since its lead time advantage over competitors is insignificant overseas. Promising showings are likely from the Vectrex game system of General Consumer Electronics, a Milton Bradley subsidiary, and the ColecoVision joint venture with CBS.
- 4) The coin-operated game market has encountered a flat growth stage and will probably show a unit decline in 1983 before resuming moderate growth. The saturation of current game locations, which has severely reduced return on operators' investment, will continue to slow new game demand, in turn hampering manufacturing pricing flexibility and pressuring margins. Beyond the shakeout phase, modest unit growth should accompany increased penetration of street locations, but it will not fully offset the decline of the arcades that will probably result from the heightened competition, and from what we expect to be a progressively less favorable economic and legislative environment.
- 5) Warner Communications' Atari division will incur considerable earnings damage in its core domestic consumer game business (89% of 1982's divisional earnings), as margin erosion and market share pressure compound the effects of a flattening market. Although Atari appears capable of containing the market share erosion in installed hardware consoles and cartridges, and holding its share at no less than 40% through 1986, pretax income for this segment is expected to fall from \$340-\$380 million in 1983 to about \$175-\$200 million in 1986. Nevertheless, a case can still be made for Atari earnings growth from three emerging sources: (a) international video game markets, whose rapid revenue growth could entirely offset domestic profit declines, resulting in a flat level of total consumer game earnings through 1986; (b) personal computers, where incremental profits of up to \$175 million could be generated, especially in the software and peripherals areas; (c) a significant new product flow, fueled by Atari's huge research commitment. While still untested, the prospects for each program seem achievable. Taken in combination, Atari's 1986 earnings could exceed \$600 million, for a 16% annual rate of increase, contributing \$5.50 per share toward WCI's projected 1986 earnings of \$7.50-\$8.00 per share. WCI's earnings could be even higher in 1986 if the Warner Amex cable venture turns around faster than we currently anticipate (1985). The following table indicates the projected earnings per share trend for WCI:

WCI Per Share Earnings Forecast

	1982E ¹	1983E	1986E	Ann. Comp. Growth Rate 1983E-86E
Atari	\$ 2.95	\$ 3.50	\$ 5.50	16%
Other Business	1.50	1.40	2.15	15
Warner Amex	(0.45)	(0.40)	0.15	-
Total	\$ 4.00	\$ 4.50	\$ 7.80	20%

Source: Bernstein estimates.

- 6) Coleco's surprising strength in 1982 positions the company for share gains throughout the forecast period, including the capture of second place in new console shipments in 1983. As with Warner, however, earnings contributions from current products will decline after 1983, and growth must come from new product areas. The case is less clear for Coleco than for Atari; even assuming that its cartridge share remains at near-current levels and that new game-related products are launched successfully in 1983, Coleco's earnings growth after 1983 seems stalled, as the following table indicates.

CLO Per Share Earnings Forecast

	1982E	1983E	1986E	Ann. Comp. Growth Rate 1983-86E
Electronics	\$2.25 ¹	\$3.05	\$3.25	2%
Other Business	0.45	0.55	0.80	13
Total	\$2.70 ¹	\$3.60	\$4.05	4%

1 - Restated after 2-for-1 split in 1983.

Source: Bernstein estimates.

- 7) Mattel appears the most vulnerable consumer game participant, currently holding a shaky second position to Atari. Severe console competition from both Coleco and Atari has seriously jeopardized Intellivision's higher-end niche, and the proliferation of price discounts has caused profit margins to erode sharply. Continued share loss by Intellivision hardware is likely, and third-party software manufacturers will be launching major assaults on its license-weak software business. It is questionable whether Mattel's new initiative into personal computers will be able to offset the adverse earnings effects of Intellivision's decline.

- 8) Software-only manufacturers face mixed prospects in the years ahead. The emergence of a substantial personal computer game software market will help support above-average game cartridge revenue growth between 1983 and 1986, but intense competition and consequent sizable margin slippage will temper that

market's attractiveness. Activision and Imagic have demonstrated product originality and skillful marketing, and they seem well positioned to hold and/or expand their shares of this market. Imagic, in particular, appears to be aggressively pursuing new licensing opportunities as well as a broad installed base strategy; it could achieve \$200 million in revenues in 1986, with earnings growth of 25% per year.

- 9) Among other consumer game participants, Milton Bradley's GCE subsidiary appears particularly well situated with its unique Vectrex game system, in both domestic and international markets. Even with production limitations expected to curb console volume to less than 1.0 million units in 1983, GCE could add \$160 million to Milton Bradley's revenue base and up to 15% of earnings, with future market share expansion prospects favorable.
- 10) Bally is expected to share with Atari the leadership in the coin-operated game market over the long term. However, earnings from this segment, which now account for about 85% of total profits, will slow their growth considerably with the maturation of the arcade game market. Rather, the case for solid earnings growth for Bally derives from (a) increasing royalty fees on the licensing of successful coin-operated games to the home cartridge market; (b) expected higher profitability from its amusement services division, especially casino operations; (c) strong participation in the public lottery market, which could receive a considerable boost through acceptance of Bally's electronic lottery technology. Prospects for success in these areas look favorable for producing 15%-20% earnings growth for Bally, as the following table indicates:

Bally Per Share Earnings Forecasts

	1982E	1983E	1986E	Ann. Comp. Growth Rate 1983E-86E
Coin-operated Related	\$ 2.90	\$ 3.05	\$ 4.10	10%
Other Business	0.50	0.70	2.40	51
Total	\$ 3.40	\$ 3.75	\$ 6.50	20%

Source: Bernstein estimates.

- 11) Recently, video game stock prices have been driven down by doubts over near- and long-term growth prospects in the domestic game market -- concerns that we fully share. However, in spite of the poor earnings outlook in this market, a credible case can be made for Warner and Bally to achieve 15%-20% earnings growth through 1986, based upon their promising positions in developing markets. Of the two, WCI seems a clearer bet because of its more diversified base of new business areas. However, both are capable of realizing above-average investment returns, and we consider each attractive in the current out-of-favor environment.

TABLE 2
The Video Game Industry
Summary of Unit and Revenue Trends Forecast
(units and \$ millions)

	1977	1978	1979	1980	1981	1982F	1983F	1984F	1985F	1986F	Compound Annual Growth Rate 1977-82 1982-86F
Consumer Video Games											
Consoles											
Units	0.5	0.7	0.8	1.7	4.7	7.9	8.8	8.6	7.5	7.1	68%
U.S.	-	-	0.1	0.3	0.8	1.6	3.8	5.1	6.6	7.3	42%
Non-U.S.	0.5	0.7	0.7	2.0	5.5	9.5	12.6	13.7	14.1	14.4	11%
Total											(33)%
Revenue	\$ 63.0	\$ 109.5	\$ 137.0	\$ 202.0	\$ 407.0	\$ 977.0	\$ 985.0	\$ 865.0	\$ 675.0	\$ 575.0	73%
U.S.	-	-	15.0	35.0	103.0	198.0	415.0	510.0	595.0	595.0	9%
Non-U.S.	\$ 63.0	\$ 109.5	\$ 152.0	\$ 237.0	\$ 710.0	\$ 1,175.0	\$ 1,380.0	\$ 1,375.0	\$ 1,170.0	\$ 1,170.0	0%
Total											(12)%
Cartridges											
Units	1.1	2.7	3.7	8.2	30.0	71.8	100.0	110.0	120.0	120.0	14%
U.S.	-	-	0.4	1.4	5.0	12.0	30.0	46.0	55.0	70.0	55%
Non-U.S.	1.1	2.7	4.1	9.6	35.0	83.8	130.0	156.0	175.0	190.0	23%
Total											
Revenue	\$ 14.0	\$ 36.3	\$ 48.7	\$ 120.8	\$ 489.0	\$ 1,170.0	\$ 1,425.0	\$ 1,455.0	\$ 1,485.0	\$ 1,440.0	4%
U.S.	-	-	5.2	20.6	78.0	190.0	450.0	610.0	685.0	820.0	44%
Non-U.S.	\$ 14.0	\$ 36.3	\$ 53.9	\$ 141.4	\$ 547.0	\$ 1,360.0	\$ 1,875.0	\$ 2,065.0	\$ 2,150.0	\$ 2,260.0	14%
Total											
Computer Game Software											
Units (U.S. only)	-	-	-	-	1.5	7.2	17.5	30.0	47.5	87.5	75%
Revenue	\$ -	\$ -	\$ -	\$ -	\$ 25.0	\$ 115.0	\$ 262.5	\$ 420.0	\$ 617.5	\$ 810.0	63%
Consumer Video Game Revenue											
Revenue	\$ 79.0	\$ 145.8	\$ 205.9	\$ 378.4	\$ 1,282.0	\$ 2,650.0	\$ 3,517.5	\$ 3,860.0	\$ 4,037.5	\$ 4,240.0	12%
Coin-Operated Video Games											
Units (thous)	50.0	70.0	106.7	232.0	486.3	480.0	437.0	470.0	500.0	520.0	2%
Revenue (\$ mil.)	\$ 75.0	\$ 110.2	\$ 177.1	\$ 432.2	\$ 978.8	\$ 1,018.5	\$ 1,084.0	\$ 1,220.5	\$ 1,327.5	\$ 1,435.0	9%
Total Industry Revenue	\$ 154.0	\$ 256.0	\$ 383.0	\$ 810.6	\$ 2,260.8	\$ 3,668.5	\$ 4,601.5	\$ 5,080.5	\$ 5,365.0	\$ 5,675.0	12%
Consoles	41%	43%	40%	29%	31%	32%	30%	27%	24%	21%	
Cartridges	9	14	14	17	24	37	40	41	40	40	
Computer Software	-	-	-	-	1	3	6	8	11	14	
Coin-Operated	50%	43%	46%	53%	43%	28%	24%	24%	25%	25%	
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	

Source: Bernstein estimates.

Consumer Video Game Market

Forecast of Market Growth

The key to the phenomenal growth of home video games has been product innovation, in the form of programmable game consoles and challenging, imaginative game cartridges. The throttle governing that growth has been price, which, until late 1982, has concentrated game purchases among middle- and upper middle income families. Only recently have aggressive price discounts begun to make inroads into broader market segments.

We believe these two critical factors will serve to enlarge significantly the base penetration of video games, and our forecast of market growth -- cautious and conjectural as it must be -- is built upon the following principal assumptions:

- 1) Game console and cartridge development will witness continuous product quality enhancement that will stimulate new acceptance among upper end consumers as well as upgrading by a sizable portion of the current large installed base;
- 2) Steeply declining price points on entry level products will serve to expand the market into lower income and other secondary segments, as well as international markets (although perhaps somewhat below consensus expectations);
- 3) Video game development, in general, will follow an increasingly distinct direction from personal computers -- not so much in terms of capability, as in task specialization, packaging and marketing.

Within this overall framework, our analysis forecasts aggregate shipment levels of video game systems and cartridges based upon:

- 1) Rate of household penetration of game consoles,
- 2) Cartridge purchase rates per console,
- 3) Average price levels of both consoles and cartridges, based upon evolving price/mix trends,
- 4) Potential game cartridge sales to personal computers, which should be viewed as a source of incremental software revenue.

Trends in Household Penetration/Installed Base

We expect household penetration of game consoles to easily reach the 16%-17% level by year-end 1982, almost doubling the 9% mark of 1981. Abundant new product introductions, accompanied by price cuts of 15%-25% on established products, should boost penetration to the 20%-22% range in 1983, although growth in domestic unit shipments is expected to be modest (10%) compared to prior years. A flat-to-declining level of domestic unit shipments is anticipated from 1984 through 1986, reflecting market maturity and increased attention to higher growth non-U.S. markets. Nevertheless, household penetration should reach the 30% level during this period (as reflected in Tables 4 and 7), as broader price alternatives spur sales.

TABLE 3
Domestic Household Penetration of Video Game-Playing Units:
Consoles and Home Computers
(millions)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
Total U.S. TV Households	74.5	76.3	78.2	80.1	81.5	83.0	84.5	85.7	86.9	88.2
1. Video Game Consoles (Installed base) % of Households Multi-Unit	0.7	1.4	2.3	3.6	7.9	14.9	22.3	29.0	35.0	40.0
Net Video Game Homes % of TV Household Penetration	0.7	1.4	2.3	3.5	7.4	13.5	18.5	22.3	25.2	26.8
	0.9%	1.8%	3.0%	4.5%	9.0%	16.3%	21.9%	26.1%	29.0%	30.4%
2. Home Computers with Game-Playing Capability (Installed Base) % of Households Multi-Unit	n/m	n/m	0.1	0.1	0.3	1.2	3.2	6.0	9.5	13.5
Net Home Computer Households % of TV Household Penetration	-	-	-	-	-	5%	10%	15%	20%	25%
	-	-	0.1	0.1	0.3	1.1	2.6	4.2	7.6	10.2
	-	-	n/m	n/m	n/m	1.3%	3.0%	4.9%	8.6%	11.6%
3. Combined Households % Duplication	0.7	1.4	2.4	3.6	7.7	14.6	21.1	26.5	32.5	36.8
Net Game/Computer Households % of TV Household Penetration	0.7	1.4	2.4	3.6	7.5	14.1	19.5	24.3	28.6	31.6
	0.9%	1.8%	2.9%	4.5%	9.2%	17.0%	23.1%	28.4%	32.9%	36.0%

Source: Bernstein estimates.

(3/4)

These projections reflect our fundamentally positive industry outlook couched within conservative assumptions.

- 1) There is clear evidence that a strong underlying consumer appetite for games exists. The home video game business has demonstrated such dynamic momentum over a sustained period of time (dollar growth averaged 90% annually over the past five years, to \$2.6 billion in factory sales in 1982) that it has elevated the industry above the fad level. The sheer magnitude of the game-playing population (14 million U.S. households, perhaps 25 to 30 million individuals) presents a strong case against the conventional notion that the game business will sputter and fall as a casualty of changing consumer tastes. People, quite simply, enjoy the challenge of such games and the opportunity to expand their love affair with the television set.
- 2) Aggressive efforts to open new demographic markets will likely accelerate the competitive price-cutting begun in 1982. Our forecast, in Table 10, calls for average game console factory prices to decline 10%-15% in 1983, to just over \$100, with a broadened array of low-end products available in the \$75-\$85 range. While demographic data on game ownership and usage tend to be sketchy, manufacturers concur that game system sales have been concentrated in households with annual incomes over \$20,000. Significantly lower price points should serve to open up a large portion of the near 50% of all U.S. households earning below that level (Table 4); in effect, price barriers are expected to be relatively minor in 1983, and almost non-existent by 1986.
- 3) We do subscribe to the notion, however, that game system penetration will remain largely confined to households with children, numbering about 31 million in 1982, and growing 2% yearly, to only 33 million by 1986 (Table 5). (That segment can be distilled even further: the heavy user target market consists of male youths between the ages of 8 and 18, which numbered approximately 23.5 million in 1982, about the same as expected in 1986.) We base this view on these major factors:
 - a) Of Atari's current installed base, we believe that more than 90% is found within this family household demographic segment, and that other game systems are comparable in this regard. Although Atari indicates that it is actively developing games for older audiences, even the elderly, we doubt that households-with-children will account for less than 80% of game penetration during our forecast period.
 - b) The increasing versatility of personal computers will effectively preempt the vast majority of game system sales to non-child households.
 - c) A considerable degree of multiple unit ownership can be expected, as lower price points and greater task specialization evolve in both game and computer product categories. It seems only logical, however, to expect this trend to be most evident in households with children, where such multiplicity of needs should be most evident.
 - d) A summary of the assumptions for our baseline forecast for domestic household penetration and installed base by demographic markets is shown in Table 6.

TABLE 4
U.S. Family Households by Income Distribution
(millions)

	1979	% of Total Family HHs	Cumulative % of Total Family HHs	1983E	% of Total Family HHs	Cumulative % of Total Family HHs	1986E	% of Total Family HHs	Cumulative % of Total Family HHs
Total Households	78.0			84.2			88.6		
Total Family Households	58.4	100.0%		61.5	100.0%		63.8	100.0%	
% Total HHs	74%			73%			72%		
At Income Levels:									
\$50,000 and Over	3.0	5.1%	5.1%	3.4	5.5%	5.5%	3.8	6.0%	6.0%
\$35,000 - 49,999	6.0	10.3	15.4	6.5	10.5	16.0	7.0	11.0	17.0
\$25,000 - 34,999	11.2	19.2	34.6	12.3	20.0	36.0	13.4	21.0	38.0
\$20,000 - 24,999	8.4	14.4	49.0	9.2	15.0	51.0	10.2	16.0	54.0
	28.6	49.0%	49.0%	31.4	51.0%	51.0%	34.4	54.0%	54.0%
\$15,000 - 19,999	8.7	15.2%	64.2%	8.3	13.5%	64.5%	8.3	13.0%	67.0%
\$10,000 - 14,999	9.1	15.6	79.8	9.2	15.0	79.5	9.3	14.5	81.5
Below \$10,000	11.9	20.2	100.0	12.6	20.5	100.0	11.8	18.5	100.0
	29.8	51.0%	100.0%	30.1	49.0%	100.0%	29.4	46.0%	100.0%

Source: Current Population Reports, U.S. Bureau of the Census, and Bernstein estimates.

(3/5)

TABLE 5
U.S. Family Households by Number of Children
(millions)

	1975	1980	1983E	1986E	Annual Compound Growth Rate		
					1975-80	1980-83E	1983-86E
Total Households	71.1	80.7	84.2	88.6	2%	2%	2%
Total Family Households	55.7	59.5	61.5	63.8	1	1	1
% of Total HHs	78%	74%	73%	72%			
With 1 child	11.0	12.2	13.0	14.2	2	2	2
With 2 children	10.0	11.3	12.1	13.0	2	2	2
With 3 children	5.2	4.6	4.3	4.0	(2)	(2)	(2)
With 4 or more children	3.8	2.4	2.0	1.8	(9)	(6)	(3)
Total Families w/children	30.0	30.5	31.4	33.0	1%	1%	2%
% of Total HHs	42%	39%	37%	37%			

Source: Current Population Reports, U.S. Bureau of Census.
and Bernstein estimates.

(3/6)

TABLE 6
Domestic Household Penetration
and Installed Base

	<u>1982</u> (in millions)	<u>1986E</u>
<u>Primary Domestic Market</u>		
Households with children	31.0	33.0
Households with one or more consoles	12.5	21.8
% Penetration	40.7%	66.7%
<u>Other Domestic Markets</u>		
Other households	52.0	55.2
Other households with one or more consoles	1.0	5.0
% Penetration	2.0%	9.1%
<u>Total Domestic Market</u>		
Total TV Households	83.0	88.2
Households with consoles	13.5	26.8
% Penetration	16.3%	30.4%
<u>Market Mix</u>		
Primary	92.5%	81.5%
Other	7.5	18.5
	100.0%	100.0%

Source: Bernstein estimates..

These numbers suggest, perhaps, too precise a view of this still-evolving market. In point of fact, we are less committed to a forecast for dedicated hardware units because we believe it highly probable that game systems may take new forms, the most likely being accessory modules to personal computer systems. (A recent example is Milton Bradley's announced plans to market a game-playing peripheral module to attach to the Texas Instruments' 99/4A personal computer.)

As the balance of this analysis will stress, the specific hardware configuration of the future game marketplace is less important than the size and scope of the game software market. The preceding analysis is really our approach to defining the parameters of a large, more amorphous market - whether the actual player/vehicle is game-dedicated, a personal computer or a hybrid of the two will make little difference in the long run (1985 and beyond). Should computer penetration evolve more rapidly than provided for in our estimates, then our software market forecast will prove to be conservative.

The Encroaching Personal Computer

The key variable in the continued growth of game console household penetration is the degree to which, and the rate at which, personal computers grow and presumably usurp the game market.

TABLE 7
Forecast of Home Video Console Shipments and Installed Base¹
(millions)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Compound Annual Growth Rate	
											1977-1982	1982-1986
Atari												
Shipments												
Domestic												
VCS2	0.3	0.4	0.7	1.0	3.1	4.5	3.5	2.5	1.0	-	72%	(42)%
Deluxe 3200	-	-	-	-	-	0.3	1.5	1.2	0.8	0.7	-	24
New Models	-	-	-	-	-	-	0.7	1.0	1.7	1.8	-	-
Subtotal	0.3	0.4	0.7	1.0	3.1	4.8	4.2	3.7	3.0	2.5	74%	(41)%
Non-U.S. (All Models)	-	-	0.1	0.2	0.8	1.0	2.0	2.5	2.0	2.0	-	32%
Total Units	0.3	0.4	0.8	1.2	3.9	5.8	6.2	6.2	5.0	4.5	81%	(41)%
Installed Base												
Domestic												
VCS	0.3	0.7	1.4	2.3	5.2	8.2	11.0	11.5	11.5	11.0	98%	5%
Deluxe 3200	-	-	-	-	-	0.3	1.7	2.0	2.4	3.0	-	90
New Models	-	-	-	-	-	-	0.2	1.1	2.2	3.0	-	-
Subtotal	0.3	0.7	1.4	2.3	5.2	8.5	12.9	13.6	13.9	14.0	100%	18%
Non-U.S.	-	-	0.1	0.3	0.8	1.7	3.5	5.7	8.3	10.7	-	88%
Matell												
Shipments												
Domestic												
Intellivision ²	-	-	-	0.2	0.9	1.5	1.0	0.6	-	-	-	-
New Models	-	-	-	-	-	-	0.2	0.5	0.8	0.8	-	-
Subtotal	-	-	-	0.2	0.9	1.5	1.2	1.1	0.8	0.8	-	(14)%
Non-U.S.	-	-	-	-	0.1	0.3	0.6	1.0	0.8	0.7	-	14%
Total Units	-	-	-	0.2	1.0	1.8	1.8	2.1	1.6	1.5	-	(14)%
Installed Base												
Domestic	-	-	-	0.2	1.1	2.5	3.4	4.3	4.8	5.3	-	31%
All Units	-	-	-	-	0.1	0.4	0.9	1.9	2.5	2.8	-	26%
Non-U.S.	-	-	-	-	-	-	-	-	-	-	-	-
Coleco												
Shipments												
Domestic												
ColecoVision	-	-	-	-	-	0.5	1.6	1.7	0.5	0.2	-	(20)%
New Models	-	-	-	-	-	-	-	-	0.3	1.0	-	-
Subtotal	-	-	-	-	-	0.5	1.6	1.7	0.8	1.2	-	24%
Non-U.S. (Coleco CBS)	-	-	-	-	-	-	0.2	0.5	0.8	1.0	-	-
Total Units	-	-	-	-	-	0.5	1.8	2.0	1.6	2.2	-	45%
Installed Base												
Domestic	-	-	-	-	-	0.5	1.9	3.1	4.2	5.2	-	80%
Non-U.S.	-	-	-	-	-	-	0.2	0.7	1.4	1.9	-	-
Odyssey³												
Shipments												
Domestic	-	0.1	0.2	0.3	0.5	0.5	0.4	0.3	0.3	0.2	38%	(7)%
Non-U.S. ⁴	-	-	-	-	-	-	-	-	-	-	-	-
Total Units	-	0.1	0.2	0.3	0.5	0.5	0.4	0.3	0.3	0.2	38%	9%
Installed Base												
Domestic	-	-	-	-	-	0.1	0.6	1.0	1.0	1.0	-	78%
Non-U.S.	-	-	-	-	-	-	0.2	0.5	1.0	1.0	-	60%
Total Units	-	-	-	-	-	0.1	0.8	1.5	2.0	2.0	-	-
GCE/Milton Bradley												
Shipments												
Domestic	-	-	-	-	-	0.1	0.6	1.0	1.0	1.0	-	78%
Non-U.S.	-	-	-	-	-	-	0.2	0.5	1.0	1.0	-	60%
Total Units	-	-	-	-	-	0.1	0.8	1.5	2.0	2.0	-	-
Installed Base												
Domestic	-	-	-	-	-	0.1	0.7	1.6	2.5	3.3	-	135%
Non-U.S.	-	-	-	-	-	-	0.2	0.7	1.6	2.7	-	-
Other												
Shipments												
Domestic	0.2	0.3	0.2	0.1	0.2	0.5	0.8	1.0	1.2	1.5	11%	3%
Non-U.S.	n/m	n/m	0.1	0.1	0.1	0.2	0.4	0.6	1.0	1.5	18%	4%
Total Units	0.2	0.3	0.3	0.2	0.3	0.7	1.2	1.6	2.2	3.0	-	-
Installed Base												
Domestic	0.3	0.5	0.6	0.6	0.7	1.1	1.6	2.3	3.0	4.7	17%	36%
Non-U.S.	n/m	n/m	0.1	0.2	0.3	0.4	0.7	1.0	1.5	2.2	18%	53%
Total												
Shipments												
Domestic	0.5	0.7	0.8	1.7	4.7	7.9	9.8	8.8	7.5	7.1	68%	(13)%
Non-U.S.	100%	16%	29%	98%	176%	24%	10%	(23)%	(5)%	(5)%	-	42%
Non-U.S. & Growth	n/m	n/m	0.1	0.3	0.8	1.6	3.8	5.1	6.5	7.3	-	-
Combined & Growth	0.5	0.7	1.0	2.0	5.5	9.5	13.6	13.7	14.1	14.4	74%	11%
100%	16%	43%	100%	175%	24%	10%	3%	3%	3%	3%	-	-
Installed Base												
Domestic	0.7	1.4	2.3	3.6	7.0	14.4	22.7	29.0	35.0	40.0	85%	2%
Non-U.S.	100%	100%	64%	94%	119%	90%	49%	29%	20%	14%	-	67%
Non-U.S. & Growth	n/m	n/m	0.1	0.4	1.3	2.4	6.0	10.5	16.3	21.7	-	-
Combined & Growth	0.7	1.4	2.4	4.0	8.3	17.4	28.7	39.5	51.3	61.7	90%	3%
100%	100%	71%	71%	11%	11%	97%	82%	40%	30%	19%	-	-

n/m - not meaningful.

¹ Average rates of 55-100 per year, varying by system.

TABLE 8
Market Share Analysis of Game Consoles - U.S. and Non-U.S.
New Units and Installed Base

	Compound Annual Growth Rate 1977-82 1982-86F									
	1977	1978	1979	1980	1981	1982F	1983F	1984F	1985F	1986F
U.S. - New Units (mil.)	0.6	0.7	0.9	1.7	4.7	7.9	8.8	8.6	7.5	7.1
Atari	50%	57%	78%	63%	66%	61%	48%	43%	40%	35%
Mattel	-	-	-	13	20	19	14	13	11	11
Coleco	-	-	-	-	-	6	18	17	16	16
Odyssey	16	14	11	15	10	6	4	4	4	3
GCE/Milton Bradley	-	-	-	-	-	1	7	12	13	14
Other	34	29	11	9	4	6	9	12	16	21
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
U.S. - Installed Base ¹ (mil.)	0.7	1.4	2.3	3.6	7.9	14.9	22.3	29.0	35.0	40.0
Atari	43%	50%	61%	64%	66%	64%	58%	52%	49%	47%
Mattel	-	-	-	6	14	17	15	15	14	13
Coleco	-	-	-	-	-	3	9	12	13	14
Odyssey	14	14	13	13	11	8	7	6	5	5
GCE/Milton Bradley	-	-	-	-	-	-	3	5	8	9
Other	43	38	26	17	9	7	7	8	10	12
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Non-U.S. - New Units (mil.)	n/m	n/m	0.1	0.3	0.8	1.6	3.8	5.1	6.6	7.3
Atari	-	-	75%	80%	75%	63%	53%	49%	46%	41%
Mattel	-	-	-	-	12	19	16	20	12	7
Coleco/CBS	-	-	-	-	-	-	-	10	11	14
GCE/Milton Bradley	-	-	-	-	-	-	5	10	15	18
Other	-	-	25	20	13	18	21	11	15	20
Total	-	-	100%	100%	100%	100%	100%	100%	100%	100%
Non-U.S. - Installed Base ¹ (mil.)	n/m	n/m	0.1	0.4	1.0	2.5	6.0	10.5	16.3	21.2
Atari	-	-	90%	75%	73%	68%	58%	54%	50%	50%
Mattel	-	-	-	-	9	16	15	17	15	13
Coleco/CBS	-	-	-	-	-	-	3	7	9	11
GCE/Milton Bradley	-	-	-	-	-	-	3	7	10	13
Other	-	-	10	25	18	18	21	15	16	15
Total	-	-	100%	100%	100%	100%	100%	100%	100%	100%
New Non-U.S. Units as % of Worldwide	-	-	0	10%	15%	17%	30%	37%	45%	51%
Installed Non-U.S. Units as % of Worldwide	-	-	0	10%	11%	14%	21%	27%	32%	35%

n/m - not meaningful.

1 - Includes multiple-unit households.

Note: Discrepancies due to rounding.

Source: Bernstein estimates.

(3/8)

TABLE 9
Video Game Console Revenues Forecast
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Compound Annual Growth Rate	
											1977-82	1982-86E
Atari	\$ 33.0	\$ 44.0	\$ 75.0	\$ 132.0	\$ 410.0	\$ 667.0	\$ 620.0	\$ 558.0	\$ 510.0	\$ 440.0	82%	(7)%
Mattel	-	-	-	35.0	190.0	297.0	225.0	200.0	130.0	70.0	n/m	(32)
Coleco	-	-	-	-	-	75.0	234.0	189.0	180.0	187.0	n/m	23
Odyssey/Magnavox	-	13.0	25.0	35.0	60.0	60.0	36.0	31.0	30.0	18.0	67	(36)
GCE/Milton Bradley	-	-	-	-	-	12.5	120.0	180.0	220.0	230.0	n/m	86
Others	30.0	52.5	52.0	35.0	50.0	73.5	125.0	152.0	200.0	225.0	23	(1)
Industry Total	\$ 63.0	\$ 109.5	\$ 152.0	\$ 237.0	\$ 710.0	\$ 1,175.5	\$ 1,380.0	\$ 1,375.0	\$ 1,270.0	\$ 1,170.0	80%	(4)%
% Change	-	74%	39%	56%	20%	65%	17%	(1)%	(8)%	(8)%		

n/m - not meaningful.

Source: Corporate reports and Bernstein estimates.

(3/9)

TABLE 10
Video Game Console Market
Manufacturer's Average Price Forecast¹

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Average Annual % Decline 1981-1986	Total Price % Decline 1982-1986E
Atari	\$110	\$110	\$110	\$110	\$110	\$115	\$100	\$ 90	\$ 85	\$ 80	(6)%	(27)%
Mattel	-	-	-	170	190	165	125	95	85	80	(16)	(58)
Coleco	-	-	-	-	-	150	130	105	95	85	(12)	(43)
Odyssey/Magnavox	-	130	130	120	120	120	105	105	100	90	(5)	(21)
GCE/Milton Bradley	-	-	-	-	-	160	135	120	110	100	(11)	(37)
Others	150	175	170	170	160	120	105	95	85	75	(14)	(53)
Average Unit Price	\$126	\$156	\$152	\$118	\$129	\$123	\$110	\$100	\$ 90	\$ 81	(10)%	(34)%
% Change	-	24%	(3)%	(22)%	9%	(4)%	(11)%	(9)%	(10)%	(10)%		

1 - Assumes multiple product lines for Atari, Mattel, Coleco, Odyssey and GCE.

Source: Bernstein estimates.

(3/10)

By our estimates, at year-end 1982 there were 1.0-1.5 million households possessing personal computers, and this number is expected to grow dramatically, to more than 10 million, by 1986, for a penetration rate of about 11%-12% (as indicated in Table 3). This level assumes a growth rate of new unit shipments averaging 40% annually between 1982 and 1986, fueled by a number of factors:

- 1) Persistently heavy price-cutting;
- 2) A rapid rate of new product introductions (both line extensions from present manufacturers and a host of new entrants, notably the Japanese companies);
- 3) An unprecedented emphasis on consumer marketing that will greatly expand the number of distribution outlets and will generate practical, easier-to-use software applications and data bases.

Given this reasonably bullish outlook on personal computers, there are some conventional issues in the computer-video game controversy that need close examination, as discussed below:

Entertainment and Utility

The first notion is a philosophical one: since the computer has evolved as a "business machine," and the video game as a "toy," some would reason that consumers will change their behavior accordingly and so lose interest in playing games. Such a view is logical, rational, and totally unsupported in the marketplace:

- a) Of the present installed base of home computers, probably 65%-75% are of the low-end variety, including the Atari 400, Texas Instruments' 99/4A, Commodore's VIC-20, and the Tandy TRS-80. Consumer research and field discussions with software retailers indicate that these systems now are used predominantly to play video games, while providing literacy, or familiarity, with computers in general.
- b) Since we believe that continued high penetration growth of such computers is contingent upon low-end market expansion, games can be expected to continue to play a significant software role.
- c) Even among "high-end" Apple II owners, more than 60% of the software units purchased are games, developed by third-party engineers. Games are actively being developed as well for the IBM PC and other seemingly serious machines.

We account for this fixation with games in a few ways. The quality of current non-game software applications (home finance, record-keeping, educational) is dismal even by manufacturers' admission, and has thereby limited the potential versatility of the low-priced computers. Since many personal computer owners previously owned (or still own) game consoles, they have retained their old habits. Then, too, many parents bring home a computer with the intent that their children learn "literacy" and improve their school work, while they may themselves plan the household budget. The kids, of course, end up playing games. Perhaps the boldest explanation for this trend, however, is that adults also buy and play computer games, a conclusion of huge potential significance.

Modest Rate of Console Displacement

Our estimates indicate that the 10% household penetration mark for home computers will not be reached until 1985 or later. We therefore do not view computers as an immediate threat in the larger low-end market for games. Price disparities and better targeted marketing efforts will likely sustain the domestic game-only market at roughly comparable console unit levels for two years at least.

It is in the high-end and trade-up segment of the market where new game consoles that depend upon existing technology stand to be hurt. In this regard, the 5200 Deluxe Atari and, to a lesser extent, the Intellivision are vulnerable since they are targeted to the same upper income and educated family market as home computers. The window of opportunity for these models may be open only 12-18 months, depending upon pricing developments.

The key to penetrating the trade-up segment will be technology improvements unduplicated by computers. Such advances -- including better graphics and sound replication, or enhanced "interactivity" -- should continue to drive the game consoles market. Furthermore, as people become more comfortable with the concept (and the low price points) of personal computers, they will accept the existence of multiple units in the home, just as they now own multiple TV sets (1.7 per household on average). Thus, with increased product specialization, both a state-of-the-art personal computer and a similarly advanced game system will likely find a place in the family home of tomorrow.

A more pressing concern is which, if any, of the current game manufacturers will successfully bridge the home computer market. We believe that Atari's established product strength, software support and distribution will prove a formidable advantage as competition intensifies. Other companies, particularly toy manufacturers such as Mattel and Coleco, are likely to have a more difficult time gaining a foothold among the growing crowd of competitors.

The Software Market -- Resilient Growth

On the software side of the market, we foresee only a negligible threat from personal computers. Our projections indicate a unit growth rate for game software (including personal computer software) of 25%-30% annually through 1986. This rapid growth reflects the increasingly additive nature of the installed bases of game consoles and computers. Significant, too, is that among personal computer households, probably half will have never owned a game console, but will become exposed to game software as current marketers develop and/or license their games for different hardware systems. The true market potential for game software will therefore likely exceed our projections for game console owners by a wide margin.

Current Developments -- New Products, Broader Price Range

The near-term outlook presents several developments which should continue to stimulate healthy growth in new game consumption:

- 1) The second-half 1982 launches of Atari's new deluxe game unit, the 5200, and the Coleco console entry (ColecoVision), both priced initially at under \$200 retail, have had two important effects:

- a) As the first major new hardware systems in two years, they are testing the waters for the trade-up/replacement market among current game console owners.
 - b) They put pressure on lower end game prices, fueling a "push-through" effect for entry level products which should spur further game-only penetration and cartridge demand.
- 2) More intense emphasis on software development and marketing will, in turn, help support hardware sales growth (just as Atari found when its first-quarter 1982 release of "Pac-Man" sparked significantly above-trend sales of VCS consoles), and will likely lead to a larger variety of games as market segmentation unfolds.
 - 3) Technology enhancement, from both established manufacturers (Atari) and new entrants (Coleco and Milton Bradley's General Consumer Electronics), will make console systems more varied and of better play quality, incorporating more computer memory and higher caliber graphics. In this regard, the distinction between game-only consoles and personal computers -- in terms of underlying capability -- will continue to diminish and will become more a question of how the machines are marketed.

It is noteworthy that in addition to hardware improvements, game engineers are discovering ways to inject more ROM memory into cartridges that play on older, less advanced game systems, extending their effective life. The Atari VCS, for example was limited by its storage capacity to games with only 2K or 4K of ROM. But through "bank-switching" of larger memory chips in a cartridge today, games like "Donkey Kong" can be played on the VCS with up to 32K of ROM, adding enhanced graphic liberty to the game designer.

- 4) Plug-compatibility across systems may increase software sales, but it poses significant risks to console makers. Coleco will test this direction first with a module permitting play of Atari VCS cartridges, despite Atari's legal action on patent infringement grounds. (Atari will itself market such a module for VCS cartridge play on its 5200 system in 1983.) If Coleco succeeds, it is likely that other VCS-compatible systems, priced as low as \$50, will appear next year, turning the low-end console market into a commodity business. Similarly, VCS-compatible modules could be marketed as add-ons to personal computer systems. Either way, the low-end software market will expand, but at the price of Atari's hardware business.
- 5) New systems at the upper end are also expected, with increasing emphasis on additional built-in features such as monitors, better sound systems and various arrays of game sticks, buttons and activators. A \$500 console incorporating 64K RAM and 12K ROM, is promised by one manufacturer in early 1983, targeting the heavy arcade user market.

International Markets

Non-U.S. markets offer a substantial growth opportunity for video games over the forecast period. As Table 3 indicates, international revenue is expected to

TABLE 11
Major International TV Markets¹ 1982
 (in millions)

	<u>Population</u>	<u>Approx. No. of TV Households</u>
<u>Europe</u>		
West Germany	61.0	20.0
United Kingdom	57.0	18.0
France	55.5	18.0
Italy	57.5	13.0
Rest of Europe	110.0	32.0
Subtotal	341.0	101.0
<u>Asia</u>		
Japan	120.0	15.0
Korea	40.0	3.0
Rest of Asia	2,200.0	2.0
Subtotal	2,360.0	20.0
<u>Central, South America</u>		
Brazil	125.0	6.0
Mexico	75.0	5.0
Argentina	30.0	3.0
Rest of Central and South America	120.0	3.0
Subtotal	345.0	17.0
<u>Canada</u>	24.0	7.0
<u>Australia, New Zealand</u>	18.0	5.0
Total	3,088.0	150.0

1 - Excludes Africa, Russia, and Middle Eastern nations.

Source: Television/Radio Age International and Bernstein estimates.
 (1/12)

grow 40% annually, to \$1.4 billion by 1986. As these markets flourish in the 1983-1985 period, a significant revenue mix shift is anticipated, with foreign markets accounting for more than 50% of unit sales by 1986 and 35%-40% of the total installed console base (see Table 8). However, estimates of long-term penetration rates at or near U.S. levels seem far too optimistic, at least for the course of our forecast period.

Surprises in market share mix may well emerge, since no manufacturer is yet entrenched in these nascent markets. In our view, the vital distribution strengths of Milton Bradley (for its GCE Vectrex) and CBS (for ColecoVision) may enable their systems to gain significantly stronger relative market positions in 1983 than they possess in the domestic arena, though our forecast still indicates Atari leadership in overseas markets.

Favorable prospects overseas stem from the following factors:

- 1) Larger total market potential, with 150 million non-U.S. TV homes vs. 83 million U.S. (see Table 11). Of these, the approximately 100 million European TV homes are generally considered the best prospect for major growth.
- 2) Currently low penetration rates (1.5-2.0%), situating the non-U.S. video games segment about two years behind the U.S. in sales/ penetration trends.
- 3) The widespread perception that television programming overseas is less consistent or appealing than in the U.S., thus presenting opportunities for broader consumer acceptance of video games. (This position obtains some support by the high level overseas of video cassette recorder sales -- 75% of such systems are in non-U.S. markets.)
- 4) The scarcity of competition from indigenous or Japanese manufacturers.

Despite these opportunities, U.S. game manufacturers have been very slow to pursue these markets aggressively. Cyclical factors, such as weak foreign currency exchange rates and recessionary economies, have proven to be difficult hurdles. Additionally, the video game industry faces some secular problems in foreign markets, which leads us to more conservative forecasts:

- a) The distribution system for consumer electronics products differs in each country and is innately more difficult. Most European countries employ two-step, or multi-step, distribution, and U.S. game manufacturers have not found easy access to key distribution channels.
- b) Inefficient distribution has necessarily led to higher retail price levels, generally 25-50% above the U.S., hampering low-end market growth.
- c) Incompatible television technologies require product modifications before overseas sales can commence. More significantly, perhaps, software (for both game consoles and computers) must often be translated or adapted in order to cross cultural barriers.
- d) Personal computers have made a greater impact in European markets than in the U.S., dampening the sales potential for higher end game systems.

- e) Cultural biases may prove more significant than is generally recognized. Most non-U.S. households have only one TV set (unlike the U.S.), and parents may be more reluctant to cede the use of it to a game system. In Japan, average TV viewing consumption is even heavier than in the U.S. (8 hours a day, versus 6 1/2 hours in the U.S.), indicating a level of entrenchment that may slow game inroads.
- f) Marketing channels can be more difficult to penetrate, with certain countries (such as France) requiring some amount of local manufacturing before access to TV advertising is permitted.
- g) From the U.S. manufacturers' standpoint, there is a persistent fear of illegitimate knock-offs. Evidence of this abounds in the coin-operated game area in Europe, and in personal computers in the Far East. While game cartridges are more difficult to copy illegally than records or tapes, especially in quantity volume, it is a factor that has probably slowed some development efforts.
- h) Finally, all other things being equal, we are concerned that few European manufacturers have pursued the game market. Of the major companies, only Philips has jumped into the market, with Magnavox's Odyssey², under the trade name "Videopak." (Magnavox is a Philips subsidiary.)

Weighing the pluses and minuses, we emerge with a still positive view of overseas game potential, but with a conservative forecast for 10-15% long-term penetration.

Substantial Growth Foreseen

Even on this cautious basis, growth should be very strong in the near term. In 1983, combined hardware and software sales overseas should be nearly double this year's estimated \$400 million, and are expected to represent over 35% of total consumer video game industry revenues of \$3.9 billion in 1986. Further, we believe that if either streamlined distribution or local sourcing brings down price levels at a faster rate, these projected revenues could prove to be conservative.

Individual countries possessing greatest potential, and currently fastest growth, are the United Kingdom, Germany, France, Canada, Australia, and certain Scandinavian countries.

Major domestic manufacturers are quickly setting up either distribution channels or subsidiaries to manage these growing markets, and we expect to see market shares roughly comparable to those in the U.S. over the forecast period. Atari has had early problems establishing key relationships, but appears now to be consolidating its strength in the major markets. Mattel, with its long-standing international toy business, can leverage overseas subsidiaries (and manufacturing sites) already in place.

We expect to see strong performances from the two most recent U.S. entries, ColecoVision and GCE's Vectrex. Coleco itself holds the number two slot in Canadian toy sales, and a joint distribution venture with CBS will give it added

muscle overseas through that company's Gabriel and International Records Divisions. The GCE system, which should appeal strongly to the predominant single-TV households in Europe, is now owned by Milton Bradley, one of the most powerful overseas marketers of toys.

Price and Margin Trends: Two Diverging Markets

The emergence of separate hardware and software markets in 1982 points to some major implications that can be expected to influence future industry development:

- 1) With price as the driving force behind installed base growth, the low-end hardware market will become increasingly a low-cost manufacturing play, placing a premium upon access to raw materials (primarily semiconductor chips) and cheap labor. Conversely, at the higher trade-up end, product innovation will be more important than ever, as manufacturers face technological competition from home computers.
- 2) Software, on the other hand, will continue to evolve as a proprietary, higher margin product category. Licensing strength, marketing prowess, and sheer creativity will govern success in this market, with component and manufacturing costs a secondary concern. The risks in this market will come from copyright breaches and the pirating of products.

Consoles

Hardware systems will face continuous price competition and margin pressure over the near term. The high margins enjoyed by Atari and Mattel during the past two years (40% and 35%, respectively) are being significantly eroded now, and further declines are likely in 1983 as prices on established VCS and Intellivision models drop by 15%-25%.

- 1) The average console price (Table 10) is expected to fall about 11% in 1983, to just over \$100 (at wholesale). New console models from all major manufacturers are likely by 1984, addressing both higher end trade-up and low-end markets, with the net effect being a gradual 5%-10% annual price slide throughout our forecast period.
- 2) Rapid growth and even more steeply declining price levels on personal computers will likely impose a continuing price ceiling on games, especially at the high end of the market.
- 3) Console manufacturing costs should also decline steadily, as memory costs fall, but not at the same rate as prices, particularly as volume shipments drop after 1983. Overall margin levels are expected to erode from the present 30%+ area down to the 20% range. Japanese entries and other low-cost commodity manufacturers may ultimately challenge the low-end domestic and foreign console segments, although such moves are not evident yet.
- 4) Price declines on console units alone might be steeper than forecasted but for the likelihood that manufacturers will add more value to them at purchase -- better joystick controllers, arcade-like fire-buttons, track-ball controllers,

headphones, free starter cartridges, even additional memory chips. Although the peripherals configuration of a video game is far less extensive (and expensive) than that of a personal computer, game console purchases will probably soon include many of the additional devices that might today be sold separately.

- 5) Among established products, the Atari VCS appears particularly vulnerable to competitive products because of the huge volume of VCS-designed game cartridges, as well as its ease of manufacture. If Atari is unable to block in court Coleco's VCS-compatible module, competitive products which accommodate VCS cartridges could appear on the market for as low as \$50 in 1983, shaking that Atari product's margin structure. However, Atari's own favorable cost structure is believed to be better able to absorb price erosion than Mattel's Intellivision, which has had to cut price dramatically to confront higher end competition from Coleco.

Console Replacement Market

Rapid growth in the low-end personal computer market will place serious constraints upon the trade-up/replacement potential for current game consoles. However, our forecast (outlined in Table 12) assumes new, more advanced generations of games in the 1984-86 time frame. A core 15% or so of the installed market base is believed to be the potential for such game-only consoles throughout the forecast period.

During 1983, the first full year in which the three newest game consoles reach national distribution, we anticipate trade-ups from among 20%-25% of the 1982 year-end console base of nearly 15 million units (13.5 million households), in the following product array:

Console Trade-Up Forecast - 1983

<u>System</u>	<u>Units</u> <u>(millions)</u>	<u>% 1982 Base</u>	<u>% 1983 Base</u>
ColecoVision	1.3	9%	6%
Atari 5200 Deluxe	1.0	7	5
GCE and others	1.2	8	5
	3.5	23%	16%

The comparably priced (\$179-\$199 at retail) ColecoVision and Atari 5200 will be the leading choices, at least through 1983. Both are 16K RAM units that will offer the versatility of a VCS-compatible module (should Coleco prevail in an Atari legal challenge). Although Coleco has taken a substantial early head start, aided by its "Donkey Kong" cartridge giveaway, we expect Atari to counter with a comparable promotional maneuver (such as a free 5200 version "Pac Man" cartridge).

TABLE 12
Domestic Video Game Console Market
Forecast of Upgrade/Replacement Potential
 (millions of units)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
New Unit Shipments	7.9	8.8	8.6	8.2	7.1
Year-End Household Base	13.5	18.5	22.5	25.2	26.8
Less: Beginning Year Base	<u>7.4</u>	<u>13.5</u>	<u>18.5</u>	<u>22.5</u>	<u>25.2</u>
Net New Game Homes	6.1	5.0	4.0	2.7	1.6
Replacements or Upgrades	<u>1.8</u>	<u>3.5</u>	<u>4.6</u>	<u>5.5</u>	<u>5.5</u>
% of Total Installed Base Replacing or Upgrading	12%	16%	16%	15%	14%
New Unit Shipments Mix					
% New Game Homes	78%	60%	47%	33%	22%
% Upgrade/Replacement	22	40	53	67	78

(3/11)

Source: Bernstein estimates.



Moreover, we favor Atari's dependability to manufacture its system on a high-volume basis. Ultimately, the Atari 5200 may take the edge due to the huge backlog of Atari game licenses (many of its original VCS games will be reprogrammed for the higher resolution 5200) and some uncertainty about Coleco's ability to obtain new cartridge titles over the long term.

The Vectrex System, discussed more fully in the Competitive Strategies section of this report, seems likely to perform strongly as a trade-up or second home unit, since its self-contained monitor provides additional flexibility, and its vectron screen offers a clearly differentiated quality of game play and display. Production constraints are expected to hold unit volume down to the 0.7 to 1.0 million level through 1983, even as Milton Bradley aggressively moves to expand capacity for next year.

In summary, the replacement/trade-up market will account for moderate product volume in 1983, but significant growth must await the introduction of more advanced game systems in late 1983 or 1984. Such consoles -- featuring greater player involvement, computer animated graphics, and enhanced audio and display systems -- should provide the necessary differentiation from home computers that will clearly distinguish these now closely related markets.

Software Price and Unit Trends

Retail cartridge prices will be buffeted by countervailing forces over the next 18 months, but should net out to somewhat lower levels (10%-15%) than in 1982, as indicated in Table 17, as intense competition brings more price discounting.

Average factory prices are expected to slip from about \$16 in 1982 to \$14 in 1983, then slide gradually to the \$11-\$13 range through 1986, but with a wider variance between high and low-priced product. Manufacturing and marketing costs, meanwhile, will continue to rise, causing profit margins to contract from the 50% level in 1982 to 40%-45% in 1983, and 35% by 1986.

We anticipate near-term price erosion resulting from two main factors:

- 1) The flood of new product during Christmas 1982 should have the most immediate depressing effect on cartridge prices, especially secondary titles. For the Atari VCS alone, the number of game titles from all manufacturers will exceed 200 (even though Atari continues to pare away slower selling game titles to keep its own list at between 45 and 50). Manufacturer shipments of VCS-compatible cartridges through 1983 (Table 18) may well result in product oversupply if cartridge purchase rates deteriorate as we anticipate (see Table 14). The rash of post-Thanksgiving 1982 wholesaler cancellations would seem to confirm this situation.
- 2) The continuing 10%-15% decline in the cost of the most basic standard chips (2K, 4K) will have a further, though minor, downward influence on costs for those game manufacturers that still utilize them.

Nevertheless, we do not expect uniform price-cutting on cartridges. More likely, the multi-tiered pricing structure already in evidence will become more skewed, with "hit" arcade game and Hollywood-derived games (such as "Ms. Pac Man," "Zaxxon" and "E.T.") commanding \$30-\$40 at retail, while less compelling games get heavily discounted. Overall, the increased relative weighting of premium-priced games will support a favorable price structure for software marketers, even as new market segments are opened through aggressive hardware pricing and cartridge discounting.

In fact, rising manufacturing and marketing costs are expected to maintain a high price structure for game cartridges:

- 1) Several manufacturers are employing greater amounts of memory (ROM) in their cartridges to enhance player appeal. These more sophisticated chips can triple memory costs alone, from \$2 to \$6-\$7 per cartridge, and even higher. Although the costs of that level of memory will follow industry learning curve declines, competitive pressures will drive designers toward more powerful, custom-tailored semiconductors that will increase the chip component cost of cartridges from 50% to as high as 75%-80% by 1986.
- 2) Other production costs, such as plastic, packaging, design, transportation and labor, show little sign of significant cost savings. Several companies, such as Imagic, have implemented state-of-the-art computer design systems which can greatly reduce costly development time of game cartridge design (typically 3-6 months), yet virtually all major manufacturers are anticipating considerably higher R&D expenditures in order to remain competitive.
- 3) Game manufacturers are also facing much stiffer marketing and licensing cost hurdles. Most arcade game licensors, hedging against the prospect of retail price erosion (hence, reduced royalties), are not only demanding higher royalty percentages (between 5%-10% of sales) but also flat payments up front. Marketing costs, at the same time, have risen dramatically, to the \$2-\$5 million range per title.

Summarizing these factors, we believe that the abundance of product will act to depress wholesale and retail price levels by as much as 10% through 1983 and by 5%-7% annually thereafter. Rising costs, on the other hand, will reduce manufacturer margins from 45%-55% in 1982 to about 35% by 1986.

While such margin erosion appears inevitable, two points are key to understanding the attractiveness of the software business. First, a 40%-45% margin on a high-volume product like game cartridges is still exceptional. Second, with a year-end 1982 installed base of 14-15 million game consoles, there is tremendous profit leverage from a single "hit" game. A classic example is Atari's "Pac-Man" cartridge, which has sold, conservatively, 6-7 million units. The profit equation is quite impressive: a 50% margin on its \$22 wholesale price has yielded WCI \$0.09 a share earnings for every million cartridges sold. "Pac-Man" alone thus earned Warner somewhere between \$0.55 and \$0.65 per share in 1982 -- more than the entire Recorded Music division! Even at somewhat diminished margin levels, one can easily appreciate the incremental contribution potential of a "Ms. Pac-Man" release (January 1983) to WCI earnings.

TABLE 13
Forecast of Video Game Cartridge Shipments
(millions)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Compound Annual Growth Rate 1977-82	1982-86E
Atari VCS	1.0	2.5	3.5	7.2	22.5	34.0	40.0	40.0	35.0	30.0	102%	(4)% 100
5200	-	-	-	-	-	1.5	7.5	12.0	15.0	16.0	-	-
New Models, other	-	-	-	-	-	-	4.5	11.0	20.0	30.0	-	-
Total	1.0	2.5	3.5	7.2	22.5	35.5	52.0	63.0	70.0	76.0	105%	21%
Mattel Intellivision	-	-	-	0.6	4.5	12.0	14.0	10.0	9.0	6.0	-	(15)% 30
M-Network, Other	-	-	-	-	-	4.0	6.0	9.0	9.5	10.0	-	-
Total	-	-	-	0.6	4.5	16.0	20.0	19.0	18.5	16.0	-	2%
Activision	-	-	-	0.1	4.5	8.0	12.0	15.0	18.0	20.0	-	26
Coleco ColecoVision	-	-	-	-	-	2.0	5.0	5.0	5.0	6.0	-	32%
Atari & Mattel, Other	-	-	-	-	?	6.0	10.0	9.0	9.0	9.0	-	11
Total	-	-	-	-	-	8.0	15.0	14.0	14.0	15.0	-	17%
Odyssey/Magnavox	-	0.2	0.4	1.5	3.1	4.0	4.5	4.0	3.5	3.0	-	(7)%
Imagic	-	-	-	-	-	4.0	7.0	10.0	13.0	16.0	-	41%
CRS/Pally	-	-	-	-	-	-	3.0	6.0	8.0	10.0	-	50%
Parker Bros.	-	-	-	-	-	3.0	5.0	6.0	8.0	9.0	-	32%
GCE/Milton Bradley	-	-	-	-	-	0.3	2.5	5.0	7.0	9.0	-	134%
All Others ¹	0.1	0.1	0.2	0.2	0.9	5.0	9.0	14.0	15.0	16.0	127%	34%
Total Industry	1.1	2.7	4.1	9.6	35.5	83.8	130.0	156.0	175.0	190.0	138%	23%
% Growth	N/M	154%	46%	134%	270%	125%	55%	20%	13%	7%		

1 - Includes: Apollo, Astrocade, Commodore, Comm Vid, Data Age, MCA, Spectravision, Tigervision, Twentieth-Century Fox, U.S. Games, and others.

Source: Bernstein estimates.

(3/13)



TABLE 14
Forecast of Cartridge Shipments per Average Installed Console

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
<u>Atari</u>										
VCS	3.3	5.0	3.0	3.5	5.2	4.0	3.2	2.5	1.8	1.5
5200	-	-	-	-	-	5.0	4.5	4.3	4.2	4.0
New Models, Other	-	-	-	-	-	-	5.0	3.5	3.0	2.5
<u>Mattel</u>										
Intellivision	-	-	-	3.0	6.5	5.5	3.5	1.7	1.2	0.8
M-Network (VCS)	-	-	-	-	-	0.3	0.3	0.3	0.3	0.3
<u>Activision (VCS)¹</u>	-	-	-	n/m	1.2	1.1	1.0	1.0	1.0	1.0
<u>Coleco</u>										
ColecoVision ²	-	-	-	-	-	4.0	3.0	2.0	1.5	1.5
Atari & Mattel Systems	-	-	-	-	-	0.6	0.7	0.5	0.4	0.3
<u>Odyssey/Magnavox</u>	-	2.0	2.0	2.2	3.2	3.0	2.5	2.5	2.0	1.5
<u>Imagic³</u>	-	-	-	-	-	0.3	0.3	0.3	0.5	0.5
<u>CBS/Bally³</u>	-	-	-	-	-	-	0.2	0.2	0.3	0.4
<u>CBS/Bally³</u>	-	-	-	-	-	0.3	0.2	0.2	0.3	0.3
<u>Parker Bros.³</u>	-	-	-	-	-	3.7	6.0	4.2	3.3	2.5
<u>GCE/Milton Bradley</u>	-	-	-	-	-	3.7	6.0	4.2	3.3	2.5
<u>All Others</u>	n/m	n/m	n/m	n/m	n/m	0.3	0.4	0.5	0.5	0.5
<u>Total Industry</u>	2.0	2.5	2.2	2.4	3.9	4.8	4.5	4.0	3.5	3.2

n/m - not meaningful.

1 - Includes Mattel installed base in 1983 and after: Atari 400/800 base in 1984 and after.

2 - Does not include Coleco's "Donkey Kong", which is shipped with ColecoVision.

3 - Includes varied installed bases after 1982, including: VCS, Intellivision, ColecoVision, Odyssey, VIC-20, TI 99/4A, Atari 400/800 and others.

(3/14)

Source: Bernstein estimates.

TABLE 15
Forecast of Video Game Cartridge Revenue
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Comp. Ann. Growth Rate 1982-86E
Atari 5200 New Models, Other Total	\$ 12.5	\$ 31.3	\$ 43.7	\$ 97.2	\$ 326.3	\$ 526.5	\$ 575.0	\$ 481.0	\$ 437.5	\$ 420.0	(5)% 7%
Mattel Intellivision M-Network, Other Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 24.5	\$ 112.5	\$ 210.0	\$ 260.0	\$ 245.0	- 14%
Activision	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 60.0	\$ 150.0	\$ 195.0	\$ 255.0	- 14%
Codeco ColocoVision Atari & Mattel, Other Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 747.5	\$ 841.0	\$ 892.5	\$ 920.0	(22)% 18% (8)%
Odysey/Magnavox	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 232.5	\$ 135.0	\$ 96.0	\$ 75.0	19%
Imagic	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 85.5	\$ 125.0	\$ 114.0	\$ 120.0	- 5%
GRS/Bally	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 318.0	\$ 260.0	\$ 210.0	\$ 195.0	(17)%
Parker Bros.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 168.0	\$ 200.0	\$ 220.5	\$ 240.0	32%
GCE/Milton Bradley	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 75.0	\$ 65.0	\$ 66.0	\$ 70.0	-
All Others	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 150.0	\$ 117.0	\$ 117.0	\$ 110.0	14%
Total	\$ 12.5	\$ 31.3	\$ 43.7	\$ 97.2	\$ 326.3	\$ 526.5	\$ 1,875.0	\$ 2,065.0	\$ 2,150.0	\$ 2,260.0	14%
% Change	n/m	160%	48%	162%	287%	148%	38%	10%	4%	5%	(3/15)

Source: Bernstein estimates.



TABLE 16
Forecast of Video Game Cartridge Dollar Market Share

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
<u>Atari</u>										
VCS	89%	86%	81%	69%	60%	39%	31%	23%	20%	19%
5200	-	-	-	-	-	2	6	10	12	11
Other	-	-	-	-	-	-	3	7	9	12
<u>Total</u>	<u>89%</u>	<u>86%</u>	<u>81%</u>	<u>69%</u>	<u>60%</u>	<u>41%</u>	<u>40%</u>	<u>41%</u>	<u>42%</u>	<u>43%</u>
<u>Mattel</u>										
Intellivision	-	-	-	8%	16%	15%	12%	7%	5%	3%
M-Network	-	-	-	-	-	5	5	6	5	5
<u>Total</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>8%</u>	<u>16%</u>	<u>20%</u>	<u>17%</u>	<u>13%</u>	<u>10%</u>	<u>8%</u>
<u>Activision</u>	-	-	-	1%	12%	9%	9%	10%	10%	11%
<u>Coleco</u>										
ColecoVision	-	-	-	-	-	3%	4%	3%	3%	3%
Atari & Mattel Systems	-	-	-	-	-	8	8	6	5	5
<u>Total</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>11%</u>	<u>12%</u>	<u>9%</u>	<u>8%</u>	<u>8%</u>
<u>Odyssey/Magnavox</u>	-	10%	13%	20%	10%	5%	3%	2%	1%	1%
<u>Imagic</u>	-	-	-	-	-	5%	5%	7%	8%	9%
<u>CBS/Bally</u>	-	-	-	-	-	-	2%	4%	5%	5%
<u>Parker Bros.</u>	-	-	-	-	-	4%	4%	4%	4%	4%
<u>GCE/Milton Bradley</u>	-	-	-	-	-	-	2%	3%	4%	5%
<u>All Others</u>	11%	4%	6%	2%	3%	6%	6%	8%	7%	7%
<u>Total¹</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

1 - Discrepancies due to rounding.

Source: Bernstein estimates.

(3/16)



TABLE 17
Video Game Cartridge Average Factory Price Forecast

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Comp. Ann. % Change 1982-86E
Atari VCS 5200 and Others Average	\$12.50	\$12.50	\$12.50	\$13.50	\$14.50	\$15.50	\$14.40	\$13.30	\$12.50	\$12.00	(7)% (8) (7)%
	\$12.50	\$12.50	\$12.50	\$13.50	\$14.50	\$15.50	\$14.50	\$13.35	\$12.75	\$12.15	
Mattel Intellivision M-Network Average	\$ -	\$ -	\$ -	\$20.00	\$19.00	\$18.00	\$16.50	\$13.50	\$12.00	\$12.00	(10)% (5) (8)%
	\$ -	\$ -	\$ -	\$20.00	\$19.00	\$16.75	\$15.90	\$13.50	\$12.00	\$12.00	
Activision	\$ -	\$ -	\$15.00	\$14.50	\$15.00	\$15.00	\$14.00	\$13.25	\$12.50	\$12.00	(5)%
Coleco ColecoVision Atari & Mattel System Average	\$ -	\$ -	\$ -	\$ -	\$ -	\$19.00	\$15.00	\$13.00	\$12.00	\$12.00	(11)% (10) (10)%
	\$ -	\$ -	\$ -	\$ -	\$ -	\$18.50	\$15.00	\$13.00	\$12.50	\$12.00	
Odyssey/Magnavox	\$ -	\$17.50	\$18.00	\$18.00	\$17.00	\$16.00	\$13.00	\$12.00	\$11.00	\$10.00	(8)%
Imagic	\$ -	\$ -	\$ -	\$ -	\$ -	\$15.50	\$14.00	\$13.35	\$12.25	\$12.00	(12)%
CBS/Bally	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$14.50	\$13.50	\$12.50	\$12.00	(9)%
Parker Bros.	\$ -	\$ -	\$ -	\$ -	\$ -	\$19.50	\$15.00	\$13.50	\$13.00	\$12.00	(15)%
GCE/Milton Bradley	\$ -	\$ -	\$ -	\$ -	\$ -	\$18.50	\$16.00	\$13.00	\$12.50	\$12.00	(12)%
All Others	\$15.00	\$15.00	\$15.00	\$15.50	\$16.20	\$16.10	\$12.50	\$11.50	\$10.50	\$10.00	(18)%
Industry Average	\$13.50	\$13.75	\$13.15	\$14.70	\$15.65	\$16.20	\$14.40	\$13.25	\$12.40	\$12.00	(8)%
% Change	-	(1)%	(2)%	12%	6%	4%	(12)%	(8)%	(6)%	(3)%	

Source: Bernstein estimates.

TABLE 18
Worldwide Unit Sales and Market Share of Atari VCS-Compatible Cartridges

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
Atari - VCS Installed Base (mils.) (avg. no. per year)	0.1	0.5	1.1	2.0	4.3	8.6	12.7	16.0	18.5	20.0
Other VCS - Compatible Systems (ColecoVision, et al)	-	-	-	-	-	0.2	1.0	2.0	2.5	3.0
Total VCS Systems	0.1	0.5	1.1	2.0	4.3	8.8	13.7	18.0	21.0	23.0
% Total Consoles	30%	50%	62%	64%	66%	67%	60%	53%	47%	42%
Cartridge Shipments by Mfr. (mils.)										
Atari	0.5	2.5	3.5	7.2	22.5	34.0	40.0	40.0	35.0	30.0
Activision	-	-	-	0.1	4.5	8.0	10.0	12.0	14.0	15.0
Imagic	-	-	-	-	-	4.0	6.0	8.0	11.0	12.0
Coleco	-	-	-	-	-	4.0	6.0	7.0	7.0	7.0
Mattel	-	-	-	-	-	3.5	5.0	7.0	8.0	9.0
Parker Bros.	-	-	-	-	-	2.5	3.0	5.0	5.5	6.0
CBS/Bally	-	-	-	-	-	-	2.0	5.0	5.5	6.0
Others	-	-	-	0.1	0.2	5.0	8.0	10.0	10.0	10.0
Total	0.5	2.5	3.5	7.4	27.2	61.0	79.0	93.0	95.0	95.0
Avg. No. of Cartridges per installed VCS	5.0	5.0	3.5	4.8	6.3	6.9	5.8	5.2	4.5	4.1
Market Share by Mfr.										
Atari	100%	100%	100%	98%	82%	56%	50%	43%	37%	32%
Activision	-	-	-	1	16	13	13	13	14	14
Imagic	-	-	-	-	-	7	8	9	11	12
Coleco	-	-	-	-	-	6	6	7	7	7
Mattel	-	-	-	-	-	6	7	7	8	9
Parker Bros.	-	-	-	-	-	4	4	5	6	6
CBS/Bally	-	-	-	-	-	-	4	5	6	6
Others	-	-	-	1	2	8	10	11	10	9
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Source: Bernstein estimates.

(3/18)

High Leverage from Licensing

Licensing activity, which is expected to heighten in 1983, provides a triple benefit to the successful licensee:

- 1) Licensed games, especially arcade game conversions, have proven better and more predictable sellers than non-licensed games.
- 2) Since such games are "pre-sold" through prior consumer exposure in either arcade or movie theater environments, advertising and promotional spending need not be as high (or can be made more efficient). The consumer need not be "educated" to the product -- only be made aware that the cartridge games exist.
- 3) Market share leaders will probably emerge from the ranks of the most successful licensees, based upon a higher proportion of total sales generated by "blockbuster" titles. Although current industry figures show that the 20 best-selling titles have accounted for less than 45% of total cartridge sales to date, consumers and retailers alike will confront tremendous product confusion from the flood of new titles in late 1982 and 1983. A retreat to familiar titles will likely boost sales of well known licenses at the expense of the umpteenth "Space Invaders" imitation.

Having made this case, some qualifications must be made.

First, a license alone cannot guarantee either a creatively or a commercially successful game. Arcade, and especially film, adaptations require talented execution to satisfy customer demands. Poor adaptations may also cheapen the licensed category altogether. Other things being equal, however, we believe that strong licenses will add significantly to top line performance and will greatly reduce product risk.

Second, margins of licensed games will suffer as competition drives higher fees for limited license sources.

Third, we would distinguish a few competitors in the license-disadvantaged category, most notably Activision. This design firm has demonstrated strong resistance to the licensing pack, and its stellar performance -- built upon first-rate product and imaginative promotion -- makes a convincing case for totally creative product. Another company, Imagic, has displayed equally skilled design, but its pending public offering -- announcing an intent to license -- may compromise its commitment to original product over the long term.

Finally, it is unclear which sources of licensed product will remain most viable in the cartridge market. Arcade games have long been the mainstays in this arena, but a combination of a flat market there and a new generation of film, television and cartoon-inspired product may dislocate that order somewhat.



Cartridge Purchase Rates

Cartridge consumption rates, currently averaging between five and six per console per year across all systems, are expected to erode gradually through the forecast period to about three per system (see Table 14), as the primary market matures.

- 1) The heavy user segment of the game owner universe (teenage males) has already been largely penetrated. Installed base growth through aggressive low-end market targeting will probably dilute overall average purchase rates considerably, especially if cartridge retail prices decline only modestly, as we expect. (Current industry estimates identify the heavy user segment at around 30%-35% of the total base. Manufacturers assume that by 1983, 20% of the total base will account for 80% of cartridge sales, the matured markets ratio that has also characterized the record business and other consumer product markets.)
- 2) Increased manufacturer concentration on "blockbusters" may slow consumer purchases. "Hit" title cartridges, representing huge licensing and marketing investments, will probably be timed more sparingly in future market releases (much like films).
- 3) Multiple-unit ownership (i.e., a game system and a personal computer) will tend to reduce purchase levels for each system alone.
- 4) Although most manufacturers have adopted variable pricing schedules for games, discounting on less popular titles has not proven very effective in clearing slow-moving titles -- indicating the degree of consumer price inelasticity where game product quality is concerned.
- 5) An inevitable boredom factor will likely reduce consumption rates as the pool of new console owners begins to shrink.

Rental Market Prospects

Some industry observers have suggested that a declining cartridge-rate-per-console-owner may be manifest in the mushrooming of rental clubs originating at the smaller, specialized retail level -- a trend that would parallel that of the video cassette film business (which has become heavily rental rather than purchase oriented).

While a large rental market for game cartridges might seriously threaten game sales, particularly for secondary and low-promotion items, such a development seems unlikely for the following reasons:

- 1) Good challenging games, unlike movies, are designed to stimulate multiple plays over time as the player seeks to continually better his performance and match it against family and friends.
- 2) Game cartridges are considerably less expensive at retail than video cassette films (roughly \$25, versus \$50 and more for cassettes). With declining price levels on video game software, the economics may not favor rental in the long run.

- 3) The rental market has sprung almost entirely from specialized retailers of video tape and disk products, who represent only a small fraction of the total distribution network for video games. The bulk of the business is handled by huge retailers, toy and department stores, which have no interest in fostering a rental market.

In the long run, the rental phenomenon may permit many more small retailers to stay in the game business, even at a retail price disadvantage, by reducing necessary inventory commitments and building a steady customer base. However, rental is unlikely to seriously jeopardize game sales. (Significantly, current experience indicates that "club" renters still tend toward frequent purchases -- at least the per year average of five to seven units.)

Computer System Games

Games designed for personal computers are already experiencing enormous growth and could represent as much as 20% of total game sales by 1986, or \$800 million in sales (see Table 19). Although the 1982 market is far smaller (by a proportionate installed base factor of nine-to-one), we anticipate rapid growth in sales of personal computers that also play games, resulting in a two-to-one games-to-computers base ratio by 1986. A significant portion (up to half) of these computer purchasers will have previously owned video games and will be disposed to continue buying games. Moreover, the current purchase rate of games among computer owners is generally higher than among game console owners, whether because of higher income levels or a more fervent hobbyist concentration.

The computer game market is far more fragmented than the game-only software market, chiefly because of the larger number of incompatible computer systems. This situation is expected to continue as new hardware is constantly introduced. Nevertheless, major game manufacturers will surely develop strategies to pursue this embryonic market.

- 1) For Atari, computer system games could add \$100 million in incremental sales in 1983, and \$250 million by 1986. Atari presently makes computer (400 and 800) versions of 20%-25% of its game titles but the proportion will increase as the computer installed base grows. We expect Atari to begin marketing game versions for competing computer systems in early 1983 (possibly through a newly formed unit, Warner Software, that is actually independent of Atari), but will resist doing the same for competing game systems until new console shipments drop off dramatically. Since its relative market share of home computers is less than half its game console share, Atari cannot afford to pass up the opportunity to sell hit game properties to a much wider computer market base than its own. But to do so in the game consoles area would undermine a tightly contested struggle to hold dominant market share there.
- 2) Other manufacturers, such as CBS and Imagic are now designing their games to play in a variety of computer modes. There are also signs that allegiances may begin forming between major game cartridge manufacturers and the tiny West Coast developers of games for "serious" computers as such designers seek expanded distribution.

TABLE 19
Domestic Game Software Market Forecast
for Personal Computers
(units in millions)

	1981	1982E	1983E	1984E	1985E	1986E	Compound Annual Growth Rate 1982-86E
Consumer Computers (Installed Base)	0.4	1.6	4.0	7.0	10.5	15.0	75%
% of Base Games-Compatible ²	65%	75%	80%	85%	90%	90%	
Computer Games Hardware Market	0.3	1.2	3.2	6.0	9.5	13.5	
Software Units per System	5.0	6.0	5.5	5.0	5.0	5.0	
Total Units	1.5	7.2	17.5	30.0	47.5	67.5	75%
Average Mfr. Price per Unit	\$17.00	\$16.00	\$15.00	\$14.00	\$13.00	\$12.00	
Total Mfr. Revenue (\$ mil.)	\$ 25.0	\$115.0	\$262.5	\$420.0	\$617.5	\$810.0	63%
% Growth	-	360%	128%	60%	47%	31%	

- 1 - Games are designed for personal computers in cartridge, cassette and diskette formats.
2 - All consumer computers are expected to have either game software designed for them, or peripheral modules available that play such games. For this table, however, we are considering mainly computer systems at lower price points which will likely be designed and marketed with game-playing application in mind.

Source: Bernstein estimates.

(3/19)



TABLE 20
Personal Computer Software Market, At Retail

	<u>1982E</u>	<u>1986E</u>	
	<u>Sales by Category</u> (<u>\$ million</u>)		<u>Annual Compound</u> <u>Growth Rate</u> <u>1982-86E</u>
Business/Financial	\$275	\$1,500	53%
Recreational (Games)	175	1,200	62%
Educational, Home Mgt., Other	50	1,800	145%
Total	\$500	\$4,500	73%

	<u>Mix as % of Total</u>	
Business/Financial	55%	33%
Recreational (Games)	35%	27%
Educational, Home Mgt., Other	10%	40%
Total	100%	100%

	<u>Sales Per Installed Computers</u>	
Installed Base (mil.)	1.6	15.0
Total Software (\$ mil.)	\$500	\$4,500
Software Sales Per Unit	\$312	\$ 300

	<u>Software Sales Per Unit, By Category</u>	
Business/Financial	\$172	\$ 90
Recreational (Games)	110	90
Educational, Home Mgt., Other	30	120
Total	\$312	\$ 300

Source: Bernstein estimates.

(3/20)

- 3) Success factors in the computer games sector will include top-of-the-line licensing arrangements and broad distribution. Atari stands to be very influential in this segment at whatever time it chooses to enter it (as a non-exclusive games supplier) while CBS, Mattel, Imagic and Activision should also prove formidable competitors, in view of their strengths in game design and distribution.
- 4) Until recently, retail prices for computer games have been slightly higher than for standard game cartridges, but production costs may actually be lower once volumes grow. Since most computers have greater memory storage than game consoles, it is easier and faster to adapt a complex arcade game for a computer than it is to electronically "shoehorn" it into a relatively primitive 1K RAM VCS. One major disadvantage, however, is that games designed for auxiliary storage systems (cassette tapes or disks) are easier to copy illegally than cartridge chips -- a factor that may hurt sales significantly over the long term.
- 5) The rise of computer games as a major software market should produce another blizzard of licenses and cross-licenses, as well as litigation about rights extensions from arcade games to personal computers. The recent litigious acceleration (Magnavox v. Mattel, Magnavox v. Activision, Atari v. Imagic) may be just a prelude to further refinements in copyright law in the intangible property field. Such a development may be considered a minor risk element in the software field.

Software Distribution

Just as the manufacture of game hardware and software has become distinct, so increasingly will the distribution. Until recently, both hardware and software have been sold through some 19,000 retail outlets, led by direct factory sales to the largest national merchandise chains (Sears, J.C. Penney, K-Mart, Toys 'R' Us), with secondary outlets being fed by large wholesalers. Retail outlets have felt it necessary to support the higher margin software sales by providing the hardware, sometimes under private label, and frequently at rock-bottom margin discount.

As the growth rate of domestic hardware units begins to decline in late 1983, however, an influx of new software-only retail outlets is expected to emerge. Some outlets will build share by providing user group relationships (such as the previously cited rental arrangements); others will seek to supplement lagging record sales with games and computer software in their stock-keeping units. But the key to these smaller accounts will be the large wholesale distributors who can distill the vast number of game titles, balance retailer inventories, and, in some cases provide retailer financing.

Warner has recently expanded the role that its recorded music distribution arm (WEA) will play in the distribution of Atari games. This action should both strengthen its retail position and quicken its response time to the marketplace. Atari has been known in the past to exercise its industry dominance when dealing with a distribution account (in much the same way as HBO has with the cable TV system operators). Although some retailers claim that they will resist Atari by not carrying the 5200 and instead favoring ColecoVision or a variety of personal computer alternatives, we believe that Atari's market lead will continue to give it the upper hand with distributors.

Other software marketers with established distribution capabilities (both domestic and international) are Mattel and Coleco, via their toy businesses, and CBS, with both records and toys (Gabriel Division) experience. Parker Brothers (General Mills) and the General Consumer Electronics' Vectrex game system (Milton Bradley) also have good toy industry exposure to help launch their respective game products.

The crunch will hit the smaller less established game developers, who will find the channels increasingly clogged. Thus, the flagging Odyssey² system of Magnavox, Emerson Radio's Arcadia 2001, and Astrocade, formerly owned by Bally, will be hard pressed to obtain or hold retailer shelf space. Similarly, Commodore International, which has built distribution rapidly this year with mass merchandiser accounts for its VIC-20 computer, will find it difficult to widen retail acceptance for its "Max" machine, a low-price game console system. Obviously, if these new game systems cannot establish a retail presence, their software will not be carried.

Trends in Home Video Game Technology -- Progressive Enhancement

The same characteristics that have established and set apart the video game category from other electronic gadgetry -- rapid technology innovation, programmability, and an interactive dimension with the home player -- should continue to drive new generations of games. Product refinements such as those exhibited in the voice synthesis area, will mark near-term developments, while systems incorporating significantly advanced technological innovation should reach the market by 1984.

The principal objective of much of today's game technology research is heightened simulation -- of space and sound, of movement, of involvement in the action of the game. Current research efforts are targeted at several aspects of game enhancement to achieve that goal, as discussed below.

Graphics -- Greater Realism

Higher resolution graphics, approaching photographic realism through animation and solid geometrical three-dimensionality, is likely to be the most immediate area of game refinement. The principal means of obtaining such effects is to increase the ROM (read-only memory) contained within the game cartridges that supply the basic program and graphic instructions.

In general, the driving force behind improved game system graphics capability is the continuing high level of computer technology research. As memory/price relationships steadily improve, game systems will be able to offer larger amounts and faster "dedicated" memory to the job of creating enhanced graphics -- and at consumer price levels comparable to today's.

Current specific research efforts in the graphic enhancement area include:

- 1) Expansion of cartridge ROM. Semiconductor industry sources generally expect a doubling of memory capacity, at equivalent price, to occur every two years; some now anticipate an acceleration of that pace in the near future. For example, a one megabit (1 million) ROM chip is believed feasible in two or three years at the cost of today's 64K chip (about \$3).

The main factor in this capacity expansion progress is the research done by leading chip suppliers, such as General Instrument, in multiplying the amount of chip memory available on the same size of silicon surface (that which represents the lion's share of the chip component cost). Game designers and manufacturers thereby realize an immediate cost benefit as well as improved design flexibility.

- 2) Peripheral devices that expand the RAM memory present in game systems (e.g., Starpath Corp.'s Supercharger brings 6K RAM and 2K system ROM to the VCS, via a module and a cassette player for their designed games). This trend will likely continue to broaden the software potential for existing game systems. Such auxiliary devices are expected to proliferate as smaller independent vendors take advantage of performance gaps in the installed base created by frequent technology improvements.
- 3) High-resolution graphic concepts, now being designed by game manufacturers working in tandem with computer-aided design firms to take advantage of greater cartridge memory.

Display

Game display has been principally a function of standard television monitors, limited as they are by the 525-line horizontal raster scan technology (which "reads" picture elements line-by-line, and is restrictive in terms of the number of "moving" objects that can be accommodated at a particular time).

Although adequate for most purposes, the picture sharpness of a television has been seriously outclassed by current computer system monitors, which benefit from higher concentrations of picture elements ("pixels"), the basic on-off light units which compose an image. (A standard television set has 256 x 192 pixels -- about 50,000 in total -- while the IBM Personal Computer has 640 x 200, or 128,000.)

The most likely development to take place in this area will be the gradual inclusion of higher resolution display monitors into game systems themselves (which will have another benefit: freeing the home T.V.). One system, GCE's Vectrex, contains a 9" diagonal vector scan screen, which creates a vivid, omnidirectional visual sensation comparable to that of the arcade games; another, the premium-priced Ultravision, will include a 10" diagonal color raster screen. In fact, we would not be surprised to see a market develop for stand-alone monitors that offer enhanced resolution for game systems, whether of the vector scan or raster technology.

Voice Replication

Basic voice synthesis is available on the Odyssey² and the Intellivision Systems (similar in aural quality to Texas Instruments' "Speak'N Spell" educational games for pre-schoolers); more advanced versions are expected, including an Atari entry in 1983.

Voice recognition is a more complex technology and its implementation into home game systems is expected to be more gradual, although a Milton Bradley peripheral device which includes both voice recognition and synthesis will be available for the T.I. 99/4A in 1983. The basic semiconductor research (since digital impulses must be converted to analog for sound conversion) is well underway in this area, and further enhancements are anticipated as a form of minor product refinement for existing and new consoles.

Interactivity

The truest form of enhanced involvement is an ability by the player to design a game himself. Self-programming features are expected to become a major thrust in computer software development, and will likely be manifest in game systems as well. Examples of such games are expected from both Atari and Mattel (for their respective personal computer lines); this area should receive an ever increasing level of research attention throughout the forecast period, as computer literacy objectives become more fully manifest in game evolution.

New Delivery/Distribution Systems

Intersystem Compatibility

Peripheral devices that will permit compatibility of competing system software may be expected in the near term, depending upon the strength and enforcement of existing patents and copyrights. Coleco's VCS-compatible module is the first of these; should it escape Atari's legal challenge unscathed, other such devices can be expected in 1983. In particular, peripheral modules for game-playing through personal computers is a likely direction, and one that could significantly expand the hardware installed base.

Externally Sourced Games

- a) Cable Television - Games can presently be "broadcast" over cable lines to homes equipped with appropriate converter/adapters. (General Instruments' Jerrold Division has test marketed such a system with Mattel's Intellivision for over a year - with decidedly mixed results from the standpoint of consumer enthusiasm. Another such venture, The Games Network is scheduled to enter test markets in 1983 on a non-proprietary system basis, through converter boxes leased by the cable operators.) One immediate problem is compatibility with all available game and personal computer systems -- games for all different systems cannot be "broadcast" over the same line without a special converter, a potential cost obstacle.

- b) Telephone Lines - Leading data base marketers, such as CompuServe, offer multi-terminal games, whereby several subscribers can simultaneously take part in a computer-monitored strategy game. The major drawback here is the severely limited graphics range (telephone lines move electronic impulses at one-fourth the speed of cable TV lines, causing picture resolution to suffer). The high cost of modems and connect time (frequently long distance) may also prove to be a market deterrent.
- c) Videotext - This emerging two-way data transmission technology, employing either phone or cable lines, may solve problems presented by either existing external source, with full clear graphics and a non-dedicated decoder/keypad home receiver system. Here again, however, high connect-time charges may limit serious game applications.

Video Disk

The incorporation of video disks, particularly optical laser disks, could add an exciting dimension to home games in the mid-to-long term. Truly cinematic graphics could be stored and retrieved, in random access fashion, by a video game/personal computer and so incorporated into game play. High development costs at present make such systems in the home prohibitive for the next 3-5 years, though applications of such technology are being tested now in coin-operated games (such as Sega's "Astron Beam," shown in prototype form at the 1982 coin-operated industry trade show).

Game Software Development

Expanding household penetration of game systems will provide greater opportunities for segmentation in terms of game genre. The currently popular arcade space and maze games and sports cartridges are already being supplemented by strategy games, educational games for young children, licensed cartoon, TV and film character games, and even X-rated adult games.

The strategic significance of the segmented marketplace is that game manufacturers need not attempt to sell to all or a major portion of the game installed base -- market niches will increasingly offer software developers the chance to target specific user markets. While major licenses will still be targeted at mass audiences, a significantly disaggregated market approach is expected from software developers, resulting in more distinct company strategies and personalities.

Competitive Strategies in the Consumer Video Game MarketAtari -- Near-Term Pressures, Long-Term Dominance

The sharpened competitive climate in the domestic video game industry over the past year has hurt Atari and will continue to pressure the industry giant until new game technologies start rolling out in late 1983. In particular:

- 1) In the software market, rapid incursions by third party designers (notably Activision and Imagic) will reduce Atari's total share from 62% in 1981 to about 43% in 1982 and as low as 40% in 1983, at which level we believe it can be sustained for the remainder of the forecast period. As indicated earlier, all software developers are experiencing margin pressure, but it has been especially damaging for the industry's share leader.
- 2) On the hardware side, Atari's low-priced VCS -- which has yielded very rich margins (40%-45%) on its way to a 66% installed base market position -- appears extremely vulnerable domestically in 1983:
 - a) If Coleco's VCS-compatible module survives Atari's legal challenge, it is likely that other VCS-imitation hardware will appear in the market, priced at less than half of the VCS' current retail figure.
 - b) Even without such head-on competition, a repackaged Atari VCS unit, set for early 1983 launch, will include a second free game cartridge ("Pac-Man"), effectively reducing margins by 25%.
- 3) The Deluxe 5200 console intended originally to recapture some lost margin through high-end, premium priced sales, has already had \$50 cut from its original suggested retail price (\$249 to \$199), as the steep price declines on personal computers have exacted a toll on deluxe trade-up game consoles.

As a result of these factors, we expect Atari's margins to contract fairly sharply, to about 20% in 1982 (from 1981's 23.4%), despite a continuing revenue mix shift to higher margin software sales. We envision a further decline in 1983, with margins dropping to 18%-19% on a revenue base growth of 28%, as software prices settle slightly lower. Through the remainder of our forecast period, the division's margins are expected to continue declining gradually, to the 16%-17% level by 1986.

...Now for the Good News

Despite these trouble spots, Atari's already formidable strength will be bolstered in significant new ways, which will position Warner Communications as the best investment in video game issues over the long term. Its three-part market strategy is outlined below.

Software Strategy

- 1) Licensing Muscle -- Super-hit titles will be the key to game cartridge leadership, and Atari holds the largest number of potential hit titles, as should be clearly evident over the next 6-12 months.

- a) New Atari launches include "E.T." (November 1982), "Raiders of the Lost Ark" (December 1982) and "Ms. Pac-Man" (January 1983), for both game and computer systems -- any of which is capable of selling to half or more of the combined VCS and 400/800 installed bases, a hardware universe approaching 11 million units. The timing of such big title releases is also significant, since 50% of all game software retail sales occur in the months just prior to, and just after, Christmas.
 - b) Later in 1983, "Donkey Kong" for Atari's home computers will be marketed, representing an important opportunity for sublicensing the hit games of other cartridge manufacturers for computer modes.
 - c) Atari owns home game licenses to literally dozens of moderate to very good arcade games, both as a means of ensuring new product depth and as a preemptive maneuver against competitors. Five such games, licensed from Centuri Company's arcade games, will be marketed in early 1983.
 - d) Over the long run, Atari possesses two elements that are critical for undisputed licensing dominance: the industry's largest installed base and its deepest financial reservoir.
- 2) Potent Creative Resources -- Aside from Atari's own huge in-house design capability, several joint venture partners should contribute strongly to new products:
- Lucasfilm, for coin-op and home games;
 - Children's Television Workshop, for pre-schooler educational games revolving around a Sesame Street theme;
 - Private design firms in California and Cambridge, Mass. who are at work on a variety of Atari game projects.
 - A talking-stage relationship with Evans and Sutherland, a flight simulator designer, for coin-op game concepts as well as semiconductor chip design for both coin-op and consumer games.
 - The Atari Program Exchange (APX), a distribution channel for independent designers of Atari computer system software, which will grow in significance as the computer installed base expands.

Among the important new products designed in-house is a new sports game series, now being launched, that is comparable in play quality to Mattel's biggest sellers, the mainstays of its Intellivision product line.

- 3) Cartridge Title Library -- Although product retreads may be premature in this business, Atari holds by far the largest library of game "classics" ("Pac-Man," "Asteroids," "Space Invaders," "Missile Command," "Super Breakout," etc.), which can be reissued with additional ROM for Deluxe 5200 and personal computer play. Although Atari maintains it will not make games for competing game systems, we expect it to review that posture by 1984.

Hardware Strategy

- 1) Power of the Installed Base - Even as Atari's impressive market shares face competitive assault, it is important to keep in mind the dimension of its huge base advantage: our forecast indicates that Atari's combined hardware market share will remain in the 45%-50% area throughout the forecast period, even though new unit shipments may slip to 35%-40% by 1986.
- a) The VCS alone will continue to represent at least 50% of the domestic installed base through 1983. Of all 1982 game software shipped, about 75% of it was VCS-designed. In light of these figures, it is not hard to understand why Atari continues to cost-cut and repackage this five-year-old unit: it remains the console which strategically directs the entire industry. Ironically, the VCS-imitation hardware mentioned earlier -- such as Coleco's module, if successfully marketed -- will add to that installed base, expanding Atari's potential software reach even as it snatches hardware sales.
- b) Atari is positioned to win a significant share of the trade-up market, through either the Deluxe 5200 game system or the 400, 800 and 1983-released 1200 personal computer. To this stable of line extensions will be added an entirely new game system, probably in late 1983, whose appeal could extend well beyond the primary market that is largely penetrated.

Personal Computers -- An Integral Step

Rounding out Atari's strategic arsenal is its currently strong though unprofitable position in the personal computer market, where it holds a combined (400 and 800) market share of about 25% and gross margins averaging about 30%. (Heavy development spending, and probably some shifting of overhead from other Atari research areas, has precluded earnings from the computer division in 1982. We expect a small operating earnings contribution around \$25 million, on 1983 revenues of \$525 million, an increase of over 50% from this year's \$345 million.) Margins will be aided in 1983 when manufacturing of both the 400 and 800 go offshore to the Far East, enabling planned price cuts of 20% that will hold margins intact, while production volumes are expected to double.

With product longevity of three years or more for the 800 unit, and at least two new model introductions in 1983 (the 1200) and 1984, Atari should be able to hold 15%-20% of the rapidly growing personal computer market through 1986.

- 1) The 400 model, with a year-end installed base of 300,000 units, has proven surprisingly resilient to the onslaught of new low-end entries, especially considering its memory limitation (16K RAM nonexpandable) and less practical membrane keyboard. The problem with the 400 is twofold:
- a) It functions mainly as a high-priced game system for most owners with some primer "literacy" value, and thus does not generate much additional higher margin revenues in the form of peripheral equipment or applications software.

- b) As the low-priced entry, it must bear the brunt of incessant competitive price warfare. Its current \$245 wholesale price (which will drop to \$199 in January 1983) yields only about a 30% gross margin and is extremely vulnerable to further erosion.

We believe that the lifetime of the 400 will be short unless (as has been suggested) Atari repackages it with a new keyboard.

- 2) Atari's Model 800 represents considerably greater value than the 400, despite its price disparity (the 800 currently sells at \$500 wholesale, but will fall to about \$400 in early 1983). It offers expandability (16K RAM up to 48K) and a full-stroke 60-character keyboard, opening the 800 to far broader market opportunities (home/professional, schools, as well as games). As a result, even with its smaller installed base than the 400 (about 240,000 units), it has generated probably 65% of Atari's \$160 million in 1982 computer software and peripherals revenues -- achieving the optimal dollar-for-dollar spending ratio between hardware and software/peripherals.

At its 1983 price, the 800 cannot compete at the low end of the personal computer market. However, it is probably realizing a gross margin in excess of 40%, leaving room for more competitive pricing while retaining respectable margin levels. Even with price cuts of 20%-25% per year, Atari can maintain a 30% margin or better with volume production efficiencies as it positions the 800 into a more price-competitive midrange.

- 3) Atari's first new product of 1983 will be its Model 1200, a 64K hardware unit based on the same 8-bit 6502 microprocessor as the 400 and 800 models and fully compatible with all existing Atari computer software. In addition, the 1200 features 12 programmable "function" keys including a self-diagnostic system scan, and a built-in microprinter: it will carry a suggested retail price of under \$1000 (\$595 wholesale). Though somewhat unclear as to positioning (the 1200 is not meant to be a small business/professional-oriented unit, yet may be premature in terms of demand for home consumer use), Atari seems bent upon establishing a versatile hardware product line and shaking its marketplace image of a computer manufacturer for game-players only.

- 4) Regarding distribution, Atari's key objective is to develop computers that sell themselves, liberating them from the specialized retailer sector that offers customer service in return for higher margins. Presently, the Atari units have wider distribution than any other personal computer, reaching the customer from about 12,000 mass merchandise department store and discount locations. Even as competitive pressure builds at these outlets, Atari can maintain its pivotal distribution position, gaining increased strength from piggybacking the computer line onto its game consoles and cartridges. By comparison, Commodore sells from about 10,000 distribution points; Texas Instruments has about 8,000, as does Tandy, primarily through its Radio Shack chain.

- 5) Most importantly, Atari has the best potential among current market participants to crack the huge, latent market for personal computer applications software. Unlike Apple, IBM, Commodore, Texas Instruments, or even Tandy -- all of whom approach the market with a price/performance technological orientation -- Atari is essentially a software marketer in the consumer entertainment field. As such, the company appears to better understand the

impulses that drive consumer discretionary purchases, and is willing to invest in the internal and third-party software development that will ultimately help to sell its computer systems. Two Warner programs that may bolster its software market strength are:

- a) Atari Program Exchange -- Essentially an Atari-sponsored distribution channel for independent software designers, the APX enables Atari to tap into the third-party market, thereby enlarging the talent base designing for its systems as well as the software support crucial to building a market presence.
- b) Warner Software, Inc. -- A newly formed WCI division (and not strictly an Atari arm), this publishing unit will explore emerging software opportunities in all educational and entertainment fields, and for all major installed base systems. By remaining independent of Atari, Warner Software can proceed into software markets unfettered by parochial demands to service only Atari hardware.

New Product Directions

Although the prospects for new product successes are always difficult to evaluate, Atari's own record of innovation -- together with its massive research outlays -- almost requires consideration of a steady new product flow to be a part of its ongoing portfolio. At the present time, the most intriguing question mark among Atari's developing areas is its "Project Falcon" the company's imputed "fourth earnings leg." Little is known about the undertaking except that it involves consumer-marketed microcomputer-based products in what is described as a potential \$500 million market. Plans are expected to be disclosed by early 1983 in anticipation of a mid-year launch.

Mattel: Dropping the Ball

Mattel's Intellivision, second to the VCS console with 17% of the installed base, is probably in the most precarious position of all the major players. Mattel has built its following in the high-end market on the strength of its better quality graphics and full array of sports games cartridges. However, it has been conspicuously short on new product followthrough.

New Computer Initiatives

Mattel recently announced two significant product entries for 1983: a keyboard attachment for the Intellivision, at a \$149 retail price; and a stand-alone home computer (the "Aquarius") with expandable memory (to 52K) at a \$195 retail price.

Clearly, Mattel is seeking to retain its upscale installed base by building a bridge to the personal computer market. For several reasons, however, such a move is not viewed with great expectations for success:

- 1) Intellivision owners who want a bona fide computer can afford one (since their household incomes average near \$25,000), and will probably not settle for a "straddle" product in the form of an add-on.

- 2) In a fast-changing marketplace, the Intellivision is being increasingly viewed as dated; such a product is unlikely to inspire new purchasers looking for a "total" game and computer system. (The VCS is old, too, but it doesn't pretend to be more than it is -- a low-end game system with the best titles in the business.)
- 3) We foresee substantial difficulties for Mattel in overcoming its traditional toy company image (far more ingrained than Atari's), and for any toy manufacturer seeking to trade up into the crowded computer category.
- 4) Product development has been very uneven at Mattel. A keyboard console prototype languished in test markets for nearly two years at unacceptably high price levels (\$500 and \$600) before the current models were announced.
- 5) Good computers depend upon good software -- frequently third party-designed. It remains to be seen whether Mattel will have the talent to produce the quality of software needed to interest hardware purchasers.

Intellivision -- Rough Sledding Ahead

With or without the computer module, significant share erosion seems in store for the Intellivision; we expect its share to drop to about 16% of new domestic units in 1983, from 19% in 1982. A quality game system with a valued niche, Intellivision had its opportunity snatched away by more nimble competitors. First, it was too slow in reducing the high price of the system, allowing itself to be undercut by Coleco, and then surpassed from the standpoint of game titles by the graphically equal or better Atari 5200. Price pressure from personal computers also increased its vulnerability. Second, Mattel has been extremely slow about licensing good titles, and has experienced bad luck when it did (the "Tron" film's box office failure). Finally, Atari's new sport game cartridges strike at the very heart of Mattel's software strength.

Margin pressure will also be intense: the desperate late summer \$50 rebate program has turned into a permanent price cut, slicing 20%-25% off hardware gross margins. A private label arrangement with Radio Shack ("Tandyvision") has tightened that squeeze, since Tandy is notoriously stubborn about retaining its 50% gross retail margins.

Our forecast reflects a declining hardware unit volume trend (assuming only modest voice synthesizer acceptance) and a sliding margin structure for the next two years, even allowing for a new, cost-reduced Intellivision model expected in 1983. Certain company characteristics arouse further concerns, such as a rigid top-down corporate orientation that is not conducive to fast innovation and a chronic inventory-balancing problem.

In the international markets, Mattel's traditionally strong distribution should enhance near-term share prospects, as should the recent formation of European software design and operations centers. But the long-term viability of the higher priced Intellivision in the face of stiff competitive challenges is questionable. We anticipate considerable new unit share erosion for Mattel after 1984.

Software Outlook -- Mixed Prospects

Mattel still holds an impressive domestic installed base of 2.5 million Intellivision units at year-end 1982; by 1983, that figure should be nearly 3.5 million, with overseas units totalling nearly an additional one million. Our forecasts call for a moderate cartridge purchase rate of 3.5 per system in 1983, which could prove conservative if some top licenses are obtained ("Lock 'N Chase," licensed from Data East, has shipped 1.0 million cartridges, and Mattel has captured the "Burger Time" license from the same company). However, the converse could be just as likely. Both Activision and Imagic are now going after the Mattel cartridge market, and surprises in Intellivision cartridge market share positions are more likely to be negative for Mattel in our opinion. Some offset to such losses should come from the M-Network line of VCS-compatible cartridges. Although the fourth-quarter competitive crush in the entire VCS software market dimmed initial expectations, M-Network represents Mattel's decision to explore competing hardware markets for its games -- a position that will gain significance as the company enters the personal computer hardware and software arenas.

As for new directions, Mattel may seek to expand its activity in the reviving hand-held electronic game marketplace, where it experienced earlier success. In addition, a new line of personal "communications" devices (such as alarm systems), could benefit from the company's strength in promotion and distribution. With the intensified competition in programmable video, however, a diminishing Mattel market position seems likely.

Coleco: An End-Around Maneuver

Coleco's surprisingly strong market entry represents the most thorough exploitation of current video game technology. This is not a company likely to lead the industry into new generations of products, as Atari will, but, through quick response and savvy salesmanship, Coleco may have seized an opportunity in the video game industry that will pay handsomely in the next two to three years.

Coleco's strategy is centered on the following product moves:

- 1) The ColecoVision game console, retail priced at under \$200, which initially plays only Coleco-manufactured cartridges. An Atari VCS-compatible module, which has recently been marketed separately, is presently under suit from Atari. Other expansion modules are expected in 1983, including a personal computer keyboard and possibly a Mattel Intellivision adapter. The ColecoVision is being marketed with a free cartridge, the well adapted hit arcade game "Donkey Kong," licensed from Nintendo.
- 2) A line of other ColecoVision cartridges, including some potential hits licensed from Sega -- "Zaxxon," "Turbo" -- and a sure-fire children's license -- "Smurfs."
- 3) Several Mattel-compatible and Atari VCS-compatible cartridges (generally, the same games licensed for the ColecoVision, but adapted for the other modes as well, including the enormously successful "Donkey Kong").

- 4) A license agreement with CBS beginning in 1983. CBS will distribute ColecoVision and its cartridges worldwide (through Gabriel Division, the former Ideal Toys International, and CBS Records International) except in Canada, where Coleco itself is quite strong, and Japan, where Coleco has distribution through Sega of Japan (and a quid pro quo right-of-first-refusal for Sega's exciting line of arcade games). In return, CBS has granted Coleco the right to sublicense games for its ColecoVision that are developed by Bally and licensed by CBS.

If this ambitious smorgasbord of video game options all pans out, Coleco stands to be the true darkhorse winner. On the strength of its versatility, attractive price and good licenses, ColecoVision could take second place in the new console market by 1983, with up to a 17% market share. Our forecast anticipates that Coleco's total video game revenues will rise to over \$500 million in 1983, triple its entire revenue base of 1981. And its ties with CBS give it very strong prospects in the emerging international market.

However, there are some risks in the outlook. First, there is the question of whether Coleco's VCS-compatible module can survive Atari's lawsuit. If it cannot, many potential buyers may be disenchanted with Coleco's misleading advertising. Some portion of anticipated 1983 ColecoVision sales could be vulnerable if such a product maneuver fails. Another question concerns Coleco's ability to snag more top arcade game licenses. One present licensing source, Sega, has indicated it may want to market its own arcade game conversions. A third issue, in light of some early quality control problems, is whether the company can adequately manufacture 1.5-2.0 million ColecoVision units in 1983. Finally, even if all goes well, there is the question of what Coleco can do next to top its ColecoVision, the earnings from which will likely peak in 1983. (The company has indicated its intention to expand the ColecoVision into the home computer market.)

Coleco is a long-time manufacturer of children's toys and outdoor swimming pools; it has never competed in as technology-intensive a market as programmable video games. (Although it did break into the hand-held electronic toy field with "Telstar" in 1976, it rode its leadership position into red ink when that market collapsed in 1980.) While skeptics of the company abound, Coleco does have some things working in its favor:

- 1) Its earlier experience in the hand-held electronic game market taught Coleco high-volume microelectronics manufacturing, promotion, and, more painfully, inventory balancing. Coleco's recent line of so-called table-top arcade games -- a 2.7 million unit volume on a fixed, ten-month production cycle -- has been a highly successful example of seizing a short-lived market opportunity at minimal inventory risk. (It also reestablished the company's credibility with both consumers and retailers in terms of delivering in the electronics marketplace.)
- 2) Coleco managed to capture some very strong game licenses before it had a console product in hand. If the company can continue to manufacture and market ColecoVision successfully, Coleco will be in a better position to compete with Atari for more good licenses down the road.
- 3) As a well established toy manufacturer, Coleco has access to and leverage with the largest toy accounts -- ensuring it shelf space and store position.

While it is too early to answer the foregoing questions conclusively, early indications look favorable. Coleco expects to ship in excess of 500,000 ColecoVision units between August and December, or 100,000+ units per month. If some early shipment problems are fully resolved, and further commitments are made, it seems likely that number could be increased to 150,000 a month or 1.8 million units in 1983.

As for cartridge manufacturing capability, the company has indicated that it had the wherewithal to produce between 5 and 10 million units in the last six months of 1982. Based upon the simplicity of manufacture, and the experience of companies smaller than Coleco who have produced at comparable volume (Activision, Imagic) there should be no problem increasing that amount by 50% in 1983. Coleco is off to a strong start, and it should continue to build its competitive presence in this market.

Other Systems

Vectrex (General Consumer Electronics/Milton Bradley)

The most interesting upstart in the hardware business is the unique, truly arcade-like system developed by GCE, that is now receiving capital infusion and marketing/distribution support from Milton Bradley.

The Vectrex adapts vectron technology (essentially, an X-Y graphic display that permits omnidirectional, fine-line resolution) into a built-in monitor, thereby freeing the game from the television set. Unlike the hand-held table top arcade games, this is a programmable system of greater sophistication and has a very responsive joystick and an arcade-like panel of buttons. Like the ColecoVision, it can also accommodate a keyboard console for personal computer upgrading. The game cartridges themselves, including one resident, are excellent copies of popular games as well as licensed titles.

As a differentiated product at a higher end price (\$199-\$229), the Vectrex has clear potential in (a) the trade-up market from the VCS, (b) as a second unit in the home (with portability potential), and (c) non-U.S. markets that characteristically have fewer T.V. sets.

In its present form, the Vectrex is hampered by a small (9" diagonal) screen that is black-and-white only (plastic color overlays are provided for each separate game). In addition, the graphics, while crisp, are two-dimensional, lacking the depth and colorful backgrounds of other games.

If Milton Bradley can develop a larger color screen and a software library of games that could appeal to more than the hard-core arcader, it could have a real winner -- a prospect reflected in our forecast of a 10%-12% share of new game units in 1984.

Odyssey² (North America Philips - Magnavox): The Lost Opportunity

Odyssey has consistently been in the right place at the wrong time; it has had a game system in one form or another on the market since 1972, but could never quite capitalize on its timing advantage. The current version, Odyssey², has crept along with a market share of about 7% since its introduction in 1978; its installed base at year-end 1982 exceeded one million units.

The console offers an alpha-numeric keyboard, rare among games, and is positioned in the upper end of the market with a line of involved, higher priced strategy and adventure games.

Despite its often innovative software, the game is hindered by the lack of strong licenses and by erratic distribution and marketing efforts. At the same time, it has a large enough installed base to attract third-party designers like Imagic, a prospect that could jeopardize software sales. Odyssey clearly suffers from "absentee parentism" in terms of corporate support and direction, and while opportunities do exist for it (particularly, with its keyboard, as a step-up computer), we doubt that Magnavox will seize them. Even with a respectable voice synthesizer module option and a possible Odyssey³ in 1983, the few retailers that carry the game will be hard pressed to hold on to it with so many better quality and better promoted alternatives. Ultimately, it will lose out in the shelf space squeeze.

Astrocade (Nitron, Inc.)

Another likely shelf-space victim is the Astrocade system, developed and formerly owned by Bally. Good quality arcade-like graphics play through a console containing a distinctive throttle-like joystick controller, a calculator, a music synthesizer, quasi-computer capability, and three undistinguished resident games -- all for a \$250-\$300 retail price.

As with the Odyssey², this game lacks any compelling cartridge licenses and will be hard pressed to obtain any, since the company lacks the necessary capital to expand beyond a negligible market share. (A recent cash flow squeeze forced Astrocade's acquisition by its largest supplier -- and creditor -- Nitron, Inc. of California.)

From a product positioning standpoint, the game system is stymied by several flaws:

- 1) It is too high-priced to compete at the low end against the VCS;
- 2) As a bridge product, straddling the personal computer market, it faces much heavier retailer support provided for the VIC-20 and TI 99/4A;
- 3) It lacks the graphic excellence and basic sex appeal to compete in the high end against the 5200 or the ColecoVision.

While the market strategy of its new owner is unclear, Astrocade's prospects appear extremely limited.

Arcadia 2001 (Emerson Radio)

An eleventh-hour console entry, Emerson appears to be employing a low-yield video game strategy to help build visibility and retailer support for its core radio and T.V. businesses. The Arcadia 2001 is a cut-rate Intellivision copy, marketed with a score of derivative space and sports games. At a retail price of \$99.95, and cartridge prices at about \$25, it's hard to imagine how the game can make any money, especially since a high (25%-40%) retailer margin is assured in the absence of heavy consumer advertising by the company.

Once again, fundamental product appeal should prove more successful than pricing, and the Emerson product will have difficulty carving a niche for itself, even given its suicidal pricing strategy.

Software-Only Suppliers

In 1982, game cartridge revenues eclipsed hardware sales as the largest segment of the game industry. This trend will accelerate as sales of new domestic consoles begin declining in 1984; we expect growth of games cartridge revenues to average about 15% per year through 1986, reaching \$2.3 billion in that year.

Competition is also most intense in this segment, reflecting considerably higher margins and the relative ease of entry. However, the dynamics of the game cartridge business will prevent the type of bloodbath predicted by some observers. Specifically:

- 1) A game is not a commodity product, but a creative property that requires considerable talent to devise and program. The artistic component of a game functions as an effective barrier to many hardware or chip makers (the Japanese included) who might otherwise be capable of lower cost manufacturing.
- 2) Along the license route, there are limited sources from which to adapt games -- perhaps several dozen major arcade games, films, and T.V. series. While original games do have a significant market niche, pre-sold licenses appear to be increasing in importance to consumers.
- 3) The additive base of game systems and personal computers is large enough to support successful segmentation strategies.

Two companies that epitomize the opportunities in segmentation positioning are Activision and Imagic.

Activision (Privately Held)

The most successful of the software-only suppliers, Activision shipped in excess of 4 million VCS-compatible cartridges in 1981, and may well have doubled that number in 1982. This design firm has demonstrated a skillful imagination creating games that combine challenge with excellent graphics and unique witty story lines. Equally impressive is Activision's breadth of product success -- of 16 marketed cartridges, 12 have sold a half-million units or more, and one-half of the 10 million domestic VCS systems have at least one Activision game. In addition, Activision was the first software manufacturer to recognize the promotion-intensive "hit" element within the design ranks of the business itself, promoting the talent behind a game along with the title itself.

On the strength of its game design and marketing abilities, Activision should hold on to a healthy 12% of the cartridge market over the forecast period. Product line extension into Intellivision-compatible cartridges, as well as personal computer games, will add to its growth, though these markets have not yet been pursued aggressively. The only real question is whether Activision's total reliance upon original games, instead of presold licenses, will limit its upside potential. The answer should become more evident after the Christmas selling season.

Imagic

Imagic has been rapidly gaining market attention as one of the most innovative of game designers, with distinctive well executed games that go well beyond familiar cartridge idioms. Unit volume for 1982 is expected to have reached 4 million cartridges, and 1983 volume could be twice that figure. (A recent lawsuit by Atari charges that Imagic's best selling cartridge, "Demon Attack," infringes upon a game licensed by Atari, Centuri's "Phoenix." The outcome is not expected to seriously jeopardize our forecasts for Imagic's unit shipments.)

As the first software-only company to go public (an early 1983 offering of 2.7 million shares), Imagic brings a focus to both the risks and the phenomenal upside potential of the cartridge business. To mitigate the volatility element somewhat, Imagic has declared its intent to employ new capital for licensing titles, and is aggressively expanding its product offerings for personal computers (Atari's 400/800, Texas Instruments' 99/4A, Commodore's VIC-20) as well as the VCS, Intellivision, and Odyssey². Prospects for continued share gains on this broad-based strategy look very favorable.

Forward Deficiencies

The game demand is currently a function of the total number of games in circulation. Since the size of total inventory is the only variable, new titles growth is considered the more important, since it defines the scope of the total market rather than the short-term volatility.

Imagic in the Japanese Market

The culture for video game licensing is quite different in Japan, and is likely to require the same from outside players. While in America, the game is sold with potential licensing to the Japanese market, but in Japan, the game is sold with the potential to be sold throughout the Japanese market.

The growth of the Japanese game market is expected to be in the range of 10-15% per year, with a gradual increase in the number of titles sold, and a corresponding increase in the number of titles sold.

The licensing process of both games and software is expected to be in the range of 10-15% per year, with a gradual increase in the number of titles sold, and a corresponding increase in the number of titles sold.

The market for video games is expected to be in the range of 10-15% per year, with a gradual increase in the number of titles sold, and a corresponding increase in the number of titles sold.

Coin-Operated Video Games: Return to Equilibrium

The market for coin-operated video games, which had experienced doubling growth rates over the prior two years, ground to a standstill in 1982, as manufacturers' revenues advanced a mere 2%, to \$1.0 billion. Clouded by prospects of market saturation and producer shakeout, revenue growth over the forecast period is projected at a modest 7%-9% annually, with revenue reaching \$1.4 billion in 1986.

The near-term industry outlook is particularly troublesome:

- Unit and revenue expectations overall are for a very weak 1983, as excess locations and inventory oversupply are wrung out of the pipeline;
- The "hit" game compulsion has escalated the risk factors and the new game development costs, leaving smaller manufacturers very vulnerable;
- Modest international sales have been hard hit by illegally manufactured knock-offs;
- Flattening demand has exerted margin pressure at all levels.

Once beyond a transitional year in 1983, however, an appreciably streamlined end market is expected to emerge which, together with exciting new game technologies should revive demand growth and offer opportunities for margin expansion.

Demand Determinants

Coin game demand is essentially a function of the total number of games in locations times the rate of unit turnover. Of the two variables new location growth is considered the more important, since it defines the scope of the long-term market (rather than its short-term volatility).

Trends in New Location Growth

The outlook for coin game location expansion is not especially promising. A shift in location mix away from arcades appears likely to continue, with specific new unit possibilities emerging in the fast food restaurant chains, but overall unit numbers are expected to be flat throughout the forecast period.

The growth of new primary game locations (principally arcades) peaked in 1982, at about 10,000 (see Table 21); a gradual retrenchment to a considerably lower level, about 7,500, is expected by 1986, reflecting several factors:

- 1) The headlong growth of both arcade and street locations in the past two years has eroded coin drops (revenue per machine), which have declined by 15%-20% on average in 1982.
- 2) The scarcity and escalating costs of yet untapped high-traffic locations (especially new shopping malls) have severely dampened further arcade expansion possibilities.

TABLE 21
Coin-Operated Video Games and Locations, by Category
(000's)

	1980	1981	1982	1983E	1986E	Compound Annual Growth Rate	
						1980-82	1982-86E
I Arcade Locations							
Large Freestanding	2.0	2.5	3.0	2.5	2.5	29%	(5)%
x Games per Arcade	x 55	60	65	60	50	8	(6)
= Games	110.0	150.0	195.0	150.0	125.0	54%	(11)%
Small, Strip Mall	3.0	5.0	7.0	5.5	5.0	53%	(8)%
x Games per Arcade	x 20	22	25	25	20	nc	(5)
= Games	60.0	120.0	175.0	137.5	100.0	26%	(13)%
Total Arcades	5.0	7.5	10.0	8.0	7.5	49%	(7)%
Total Arcade Location Games	170.0	270.0	370.0	287.5	225.0	61%	(12)%
Avg. per Arcade	34	36	37	36	33	7	(3)
Other Primary Locations							
Theme Restaurants	0.1	0.2	0.4	0.6	2.5	100%	58%
Casino Hotels	0.2	0.3	0.3	0.4	0.4	22	7
Other Game Rooms	0.7	0.7	0.7	0.7	0.7	nc	nc
Total	1.0	1.2	1.4	1.7	3.6	18%	27%
x Games per Location	x 40	50	55	60	55	17	nc
= Games	40.0	60.0	80.0	102.0	200.0	35%	25%
Total Primary Location Games	210.0	330.0	450.0	390.0	425.0	46%	(1)%
II Potential Street Locations							
Food-Related Establishments							
Chain/Franchise Outlets	60.0	63.5	70.0	75.0	95.0	8%	8%
Others (incl. convenience stores, groceries, bars)	325.0	350.0	360.0	365.0	375.0	5	1
Subtotal	385.0	413.5	430.0	440.0	470.0	6%	2%
Recreation-related							
Movie Theaters	14.0	13.7	13.0	12.8	12.0	(3)%	(2)%
Bowling Centers	9.0	8.8	8.5	8.2	8.0	(1)	(1)
Others ¹	175.0	180.0	182.5	185.0	200.0	2	2
Subtotal	198.0	202.5	205.0	206.0	220.0	2%	2%
Service-related & Misc.							
Airports, Rail & Bus Depots	35.0	35.0	35.0	35.0	35.0	nc	nc
Hotels, Motels	70.0	72.0	75.0	76.0	85.0	4%	3%
Gas stations	158.0	152.0	145.0	137.0	115.0	(4)	(6)
Others ²	200.0	225.0	225.0	260.0	300.0	10	5
Subtotal	463.0	484.0	505.0	508.0	535.0	4%	1%
Total Potential Street Locations	986.0	1,100.0	1,140.0	1,155.0	1,225.0	8%	2%
Estimated % Penetration	15%	20%	25%	30%	30%	40%	6%
Total Street Locations	148.0	225.0	285.0	346.5	367.5		
x Avg. # Games per Location	x 2.5	3.0	2.7	2.5	2.0	44%	(6)%
Total Street Games	370.0	675.0	770.0	866.5	735.0		
Total Video Games	580.0	1,005.0	1,220.0	1,256.0	1,160.0	46%	(2)%
% Arcade/Other Primary	36%	33%	37%	31%	37%		
% Street Location	64	67	63	69	63		
	100%	100%	100%	100%	100%		

1 - Includes: Ski centers, skating rinks, student recreation centers, tennis/racquetball/squash clubs, health clubs, amusement parks, sports arenas, et al.
2 - Includes: Coin laundries, barber shops, auto repair, drug stores, bicycle shops, rental car offices, et al.

Source: U.S. Department of Commerce and Bernstein estimates.

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TABLE 22
Coin-Operated Video Games - Unit Shipment Forecast by Manufacturer
(000's)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Annual Compound Growth Rate	
											1977-82	1982-86E
Bally	11.5	13.0	34.7	76.5	145.9	185.0	160.0	165.0	170.0	170.0	75%	(2)%
Atari	21.9	24.6	32.5	90.0	120.2	90.0	115.0	140.0	155.0	170.0	33	17
Sega/Gremlin	4.0	8.0	10.0	27.5	32.2	42.0	45.0	50.0	55.0	60.0	60	10
Nintendo	-	-	-	-	20.5	70.0	45.0	30.0	30.0	32.0	-	(17)
Williams Electronics	-	-	-	-	55.0	40.0	30.0	30.0	35.0	35.0	-	nc
Taito	-	-	-	2.0	8.0	25.0	30.0	32.5	35.0	35.0	-	4
Gottlieb	-	-	-	-	-	2.0	10.0	10.0	10.0	10.0	-	m/m
Stern	-	-	1.4	5.3	25.6	10.0	10.0	5.0	4.0	4.0	-	(28)
Centuri	-	-	3.4	3.1	31.5	5.0	3.0	1.5	1.0	1.0	-	(30)
Cinematronics	-	10.0	2.7	5.3	11.5	2.0	-	-	-	-	-	-
Exidy	2.0	3.0	4.5	6.3	10.9	2.0	2.0	2.0	2.0	1.0	40	nc
Universal	-	-	-	1.0	5.0	2.0	2.0	2.0	2.0	1.0	-	nc
Others ¹	10.6	11.4	17.5	15.0	20.0	10.0	5.0	6.0	5.0	5.0	(2)	(5)
Total Units	50.0	70.0	106.7	232.0	486.3	480.0	457.0	470.0	500.0	520.0	56%	2%
% Growth	-	40%	52%	117%	110%	(1)%	(5)%	3%	5%	4%	56%	2%

1 - Includes: Artic, Data East, Dynamo, GDI, Game Plan, Game-A-Tron, Nichibutsu, Pacific Novelty, Rock-Ola, Sigma, Status, Thomas, Taito, U.S. Billiards, Venture Line, among others.

Source: Corporate reports and Bernstein estimates.

(3/22)

- 3) Persistent legislative efforts, at the local level, to curb arcades have resulted in higher licensing fees, increased taxes, and sporadic community bans.
- 4) Many smaller arcade operators who entered the business at its peak have suffered through the prolonged consumer recession on insufficient capital, hamstrung by extremely heavy financing burdens. As some of these operators are forced from the market, consolidation will likely take place among the largest operators (such as Bally) who can spread purchasing, maintenance, and game rotation costs over many operating sites.
- 5) A lower number of games per arcade is also likely, since incremental unit returns in highly concentrated locations are frequently marginal.

The decline in arcade locations will probably be offset over the near term by the increased penetration of the far larger base of potential "street" locations, estimated at over 1.1 million in 1982 (Table 21). This expansion should receive a major boost from the acceptance of games by certain major fast food chains, believed imminent in 1983, and could reach a 30% penetration level. However, even the addition of fast food chains is not expected to lead back to the explosive new game demand growth witnessed in 1980 and 1981:

- 1) Of the 70,000 franchised chain restaurants in the U.S., some 5,000-10,000 already have games on location (mainly in pizza restaurants). Even an optimistic 50% penetration of the remaining 60,000-65,000 restaurants, at an average of two game machines each, would represent only about a 13% increase in total industry unit output in 1983. Moreover, rapid penetration growth of fast food chains would put additional pressure on existing marginal street locations, a reflection of the market's current saturation.
- 2) On a total location basis, arcades have proven to be far more profitable than street locations, because of (a) higher unit concentration (50 or more games per arcade, versus two or three at most street locations), and (b) full retention of a game's revenue by the arcade operator, versus a 50-50% split between the street operator and the owner of the street location (bar, restaurant, etc.). When arcades proliferated in 1980 and 1981, they ignited tremendous new game demand. But as street locations gain market share, their lower return rates will moderate the purchasing rates of new games.
- 3) Street location operators encountered intense margin pressures in 1982, as the whiplash of higher operating costs and lower revenues was aggravated by:
 - a) a change in the depreciation schedule for personal property used as business equipment (like cars or coin games) from 3 years to 5 years, reducing allowable annual writedowns by 40%; and
 - b) the dissolution of a resale market for coin games, precipitated by the over-supply.

TABLE 23
Coin-Operated Video Games - Revenue Forecast by Manufacturer
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Annual Compound Growth Rate	
											1977-82	1982-86E
Bally	\$ 17.8	\$ 21.5	\$ 60.8	\$133.9	\$296.3	\$ 388.5	\$ 388.0	\$ 425.0	\$ 448.5	\$ 460.0	85%	4%
Atari	34.0	36.0	50.9	171.0	242.2	180.0	264.5	360.5	410.0	460.0	41	23
Sega/Gremlin	6.2	13.2	17.5	52.2	66.0	88.2	103.5	128.7	141.6	162.0	70	16
Nintendo	-	-	-	-	42.0	147.0	80.5	77.2	79.2	86.4	4	7
Williams Electronics	-	-	-	-	110.0	84.0	69.0	77.2	92.4	94.5	-	3
Taito	-	-	-	3.8	16.5	52.5	69.0	83.7	92.4	94.5	-	11
Stern	-	-	1.4	5.3	26.5	21.0	17.3	12.8	10.6	10.8	-	23
Gottlieb	-	-	-	-	-	4.2	23.0	25.8	26.4	27.0	-	-
Centuri	-	-	3.4	5.9	61.5	10.5	69.0	3.9	4.0	4.1	-	28
Exidy	3.0	5.0	7.8	10.1	22.3	4.2	-	-	-	-	-	-
Universal	-	-	-	1.9	10.2	4.2	4.6	5.1	5.3	5.4	-	6
Cinematronics	-	16.5	4.7	10.1	23.6	4.2	4.6	5.1	5.3	5.4	8	6
Others	14.0	18.0	30.6	38.0	61.5	21.0	11.5	15.5	13.2	77.0	18	4
Total Revenue	\$ 75.0	\$110.2	\$177.1	\$432.2	\$978.8	\$1,018.5	\$1,084.5	\$1,220.5	\$1,327.5	\$1,435.7	68%	9%
Avg. Price	\$1,500	\$1,570	\$1,660	\$1,865	\$2,010	\$ 2,100	\$ 2,300	\$ 2,575	\$ 2,640	\$ 2,700	7%	7%

Source: Corporate reports and Bernstein estimates.

(3/73)

TABLE 24
Market Share Leaders - Coin-Operated Video Games

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
Bally	23%	17%	32%	33%	30%	38%	35%	35%	34%	33%
Atari	44	29	30	39	25	19	25	30	31	33
Combined	67%	46%	62%	72%	55%	57%	60%	65%	65%	66%
Sega/Gremlin	7	11	9	12	7	9	10	11	11	11
Williams Electronics	-	-	-	-	11	6	7	7	7	7
Taito	-	-	-	1	2	5	7	7	7	7
Nintendo	-	-	-	-	4	15	8	6	6	6
Leaders' Total	74%	57%	71%	85%	77%	92%	94%	95%	97%	97%

Source: Bernstein estimates.

(3/24)

TABLE 25
Break Even Comparison for Arcade and Street Location
for Coin-Operated Game
 (Per Game Basis)

Expenses	Arcade Operator					Street Location Operator				
	1980	1981	1982	1983E	1986E	1980	1981	1982	1983E	1986
Game Price (Distributor)	\$2,200	\$2,350	\$2,500	\$2,700	\$3,300	\$2,200	\$2,350	\$2,500	\$2,800	\$3,300
Spare Parts, Maintenance	150	160	175	200	250	225	250	275	300	350
Rent, Absorbed O/H	200	250	300	350	500	-	-	-	-	-
Tax, License Fee	50	100	200	250	400	-	-	-	-	-
Cost of Game	\$2,600	\$2,860	\$3,175	\$3,500	\$4,300	\$2,425	\$2,650	\$2,850	\$3,200	\$3,850
(Depreciation) 1	(670)	(700)	(770)	(490)	(600)	(670)	(700)	(770)	(490)	(600)
(Resale Value - Avg.)	(400)	(700)	(500)	(300)	(500)	(400)	(600)	(250)	(200)	(400)
Financing Expense	400	500	550	500	750	400	500	550	500	750
Total Unit Investment	\$1,930	\$1,960	\$2,455	\$3,210	\$4,150	\$1,755	\$1,850	\$2,380	\$3,010	\$3,600
Revenue										
Average Weekly Drop	\$ 75	\$ 100	\$ 85	\$ 90	\$ 120	\$ 110	\$ 150	\$ 125	\$ 130	\$ 160
% Change	25%	33%	(15)%	6%	10%	40%	36%	(17)%	4%	7%
Net after Location Split	\$ 75	\$ 100	\$ 85	\$ 90	\$ 120	\$ 55	\$ 75	\$ 63	\$ 722	\$ 104
# Weeks to Break Even	26	20	29	36	35	32	25	38	42	35
Implicit Annualized ROI	102%	170%	80%	46%	50%	63%	110%	38%	24%	50%

1 - Change in depreciation schedule by 1982 Economic Recovery Legislation extends useful life of games from 3 years to 5 years.

2 - Increasingly, operators are demanding a higher split with the location owner. We expect the split to average 55-45 in 1983, and 65-35 by 1986.

Source: Bernstein estimates.

(3/27)

Some margin relief should be forthcoming in 1983 and beyond, as operators continue to press for higher revenue splits with location owners -- we anticipate a gradual improvement in the operators' revenue ratio, to 55%-45% (on average) in 1983, and to 65%-35% by 1986.

Trends in Game Turnover

Turnover is determined by a game's earning "life," since video games (like films) hit their peak soon after launch and decline steadily thereafter. The increased competition in 1982 (from new game titles and a record-setting motion picture season) reduced the earning life of an average video game from 40 weeks to about 28, and to below operators' breakeven points in many cases, as Table 25 indicates. (Actual useful life estimates are complicated by the fact that most operators rotate slower earning games to different locations rather than trade them in.)

One perspective on the issue of game turnover may be derived from the historical ratio of new unit shipments to games on location, as a measure of apparent scrappage. (To simplify we assume that the annual sum of actual scrapped games and exported games -- perhaps 20% of total units -- are approximately offset by illegally produced knock-offs that enter the domestic market.) Since a fairly high rate of new games per game location is necessary to insure the operators' continuing profits the rate of total base turnover also becomes significant.

TABLE 26
Total Base Turnover and Apparent Scrappage Rates

	Domestic Coin-Operated Game Market (in 000's, except percentages)				
	1980	1981	1982E	1983E	1986E
Game Shipments	232	486	480	457	520
Games in Locations	580	1,005	1,220	1,256	1,160
Base Turnover ¹ Rate	40%	48%	39%	36%	45%
Apparent Scrappage ² Rate	5%	6%	22%	36%	53%

1 - Defined as: new unit shipments/total games in locations.

2 - Defined as: (new unit shipments - growth in locations)/total games in locations.

(3/583)

Source: Bernstein estimates.

As the above table indicates, rapid location growth in 1980 and 1981 was accompanied by only slight apparent scrappage -- essentially, games simply moved from location to location, earning satisfactory returns as they went. With the recent slowdown of new locations expected to continue, however, the apparent scrappage rate will grow considerably, signifying a classic replacement market. Base turnover (shipments-to-locations ratio), meanwhile, seems to reach an optimal level at 45% annually. Deviations from that level reflected (a) in 1980, strong location growth, (b) in 1981, catch-up attempts by manufacturers that led to overproduction, and (c) in 1982, a recessionary marketplace that constrained unit output even as new locations grew an estimated 20%. An even slower rate of turnover, and hence new shipments, is anticipated for 1983 before gradual attrition of marginal game locations restores equilibrium to the installed base.

Our forecast for a 45% industry turnover rate is based on the assumption that operators themselves will adhere to current rates of inventory changeover, despite conflicting factors:

- The pace of new game introductions is expected to remain rapid over the next few years, as manufacturers scramble for market share in a flattening environment. While this new product push might be expected to generate a higher turnover rate (since the earning power of older games is constantly under competitive pressure), the growing costs involved in purchasing and maintaining video games (Table 25) are becoming a disincentive to operators who might otherwise wish to churn higher yielding games.

Segmented Growth Potential

Despite the sluggish overall environment for coin games, there are still bright opportunities that may favor individual manufacturers. Specifically:

- 1) Rapid penetration of fast-food chain restaurants could add 40,000-50,000 game machines to the base of secondary street locations in 1983 before the erosion of marginal locations becomes appreciable. Of particular importance is the likelihood that such chains (Burger King, Wendy's, etc.) will deal directly and exclusively with a single large manufacturer, providing a captive incremental market and enhanced brand status to the manufacturer's games.
- 2) Promising new technologies, such as 3-D, holography, and video disk integration are being explored actively; each should result in marketable new products during 1983. (Sega exhibited prototypes for both 3-D and video disk coin games at the operators' exposition in November.)
- 3) The "hit" dimension of the coin-operated business, while inducing high risks, can translate into an enormous profit payoff for a manufacturer. Table 28 illustrates hypothetical earnings per share contributions derived from a 50,000 unit game, with incremental licensing royalties from the home cartridge market. (Major manufacturers consider 20,000 units of a game to be successful; 50,000 units earns "hit" status.)

TABLE 27
Largest Selling Coin-Operated Games

<u>Game</u>	<u>Manufacturer</u>	<u>Units Shipped</u>	<u>Revenues (mil.)</u>	<u>Year</u>
"Ms. Pac-Man"	Bally*	101,000	\$207.1	1982
"Pac-Man"	Bally*	96,000	192.9	1981
"Donkey Kong"	Nintendo	80,000	152.0	1981-2
"Space Invaders"	Bally**	70,000	120.0	1979
"Asteroids"	Atari	70,000	129.5	1980
"Defender"	Williams	55,000	110.0	1981
"Centipede"	Atari	50,000	95.0	1981
"Galaxian"	Bally*	45,000	83.2	1980

* - Licensed from Namco Company.

** - Licensed from Taito Company.

Source: Bernstein estimates.

(3/25)

TABLE 28
Revenue and Earnings Potential of a "Hit" Game - 1982

	<u>Units Shipped</u>	<u>Licensed Cartridges</u>	<u>Per Share Contribution²</u>
	<u>50,000</u>	<u>5.0 mill.</u>	
Revenue/Unit	\$ 2,100	\$ 1.12 ¹	Warner ³ = \$0.56
Revenues (mil.)	\$ 105.0	\$ 5.6	Bally = \$0.66
Margin	30%	100%	Williams = \$2.67
Earnings (mil.)	\$ 31.5	\$ 5.6	
Net of Tax (46%) (mil.)	\$ 17.0	+	\$ 3.0 = \$20.0

- 1 - Assumes 7% royalty on wholesale price of \$16.
- 2 - Coin-op earnings and royalty income may not coincide due to time lag from cartridge development and sales.
- 3 - In Warner's case, per share earnings contributions are derived from both the coin-operated game (\$0.26) and the cartridge revenues (\$0.30), assuming a 45% cartridge margin.

Source: Bernstein estimates.

(3/584A)

Trends in Pricing and Margins

Coin game prices and margins tend to be uniform for major manufacturers and both experienced pressure from weak demand in 1982. Margins typically in the 30-35% range slid 2 or 3 percentage points for Bally (with weakness in its pinball business), perhaps 6 points for Atari's coin-op division, and much more for smaller, troubled game makers. Further declines are expected even after a shakeout period in 1983, dropping margins to about 25% by 1986, as the modest growth of new unit demand inhibits pricing flexibility. However, much of that margin loss may be recouped through licensing royalties to home cartridge manufacturers, a growth market expected to remain intense throughout the forecast period.

The manufacture of coin games is a higher fixed-cost business than the consumer game segment; the bulk of component expenses is represented by the multichip, integrated circuit boards and display monitors which electronically manipulate and communicate the game play (see Table 29). While standard memory chip costs will follow semiconductor industry decline curves of 10%-15% per year, other factors will act to restrain margins. Specifically:

- 1) Limited order quantities. Games are not built for inventory, but are scheduled for production as distributors place orders for them. Since a single game's production run is unpredictable, and many game parts are not interchangeable, large-volume component orders which would otherwise cut variable unit costs cannot be made. (The breakeven point on a game, for a major manufacturer, is in the 5,000-7,000 unit range; smaller companies with little overhead can operate at volumes of 1,000-2,000.)

TABLE 29
Typical Component Cost Breakdown for Coin-Operated Video Game

	<u>Component Price/Cost</u>	<u>% of Sale Price</u>
<u>Factory Price</u>	\$2,100	100%
<u>I Production Costs</u>		
<u>Raw Materials</u>		
- TV Monitor	275	13
- Printed Circuit Board(s) with Memory Chips	400	19
- Controls, Coin Mechanism	75	4
- Woodwork & Harnessing	150	7
- Other	150	7
Materials Total	<u>1,050</u>	<u>50%</u>
<u>II Labor, Overhead</u>	150	7
<u>Direct Costs</u>	<u>1,200</u>	<u>57%</u>
<u>Indirect Costs:</u>		
R&D, Engineering	<u>100</u>	<u>5%</u>
Total (without license fee)	1,300	62%
(with 6.5% license fee)	<u>1,450</u>	<u>69%</u>
 Operating Profit (without license)	\$ 800	38%
(with license)	\$ 650	31%

Note: Distributor Fee will add from \$300 to \$750 per game to operator's purchase costs, putting final game price at \$2,400-2,850.

Source: Bernstein estimates.

(3/28)

TABLE 30
Number of Coin-Operated Games Selling 20,000 Units or More
By Manufacturer

	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983E</u>
Bally	1	2	3	2	4
Atari	0	1	3	3	3
Sega/Gremlin	0	0	0	2	3
Williams	0	0	1	2	2
Nintendo	0	0	1	2	2
Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	1	3	7	9	15

Source: Bernstein estimates.

(3/29)

- 2) More expensive custom parts. Component costs on newer game technologies are higher, but are not fully passed along to customers (predominantly distributors, who then sell or lease to operators). Such features include high-resolution color X-Y vector scan monitors, additional custom-designed integrated circuit boards, and special effects, such as 3-D or sound.

Manufacturers are increasingly pressured to sacrifice traditional margins for market share. Bally, for example, was blessed with a long-running hit in "Ms. Pac Man," which probably yielded 33-35% margins, even after royalties to two developers of the game (Namco and a private design firm). But on its newer multi-level "Tron," additional graphics and display costs reduced unit margins to about 27% -- still healthy, but more representative of the returns game manufacturers can expect to see in the next few years.

- 3) Price ceiling at operator level. The revenue squeeze on operators had a stifling effect on new game prices, aggravated by several interrelated factors:

- a) Current product oversupply;
- b) Widespread availability of illegal "knock-off" games, which may sell for as little as half the price of the legitimate game;
- c) Limited, but growing, use of convertible kits, which substitute new circuit boards or stored instructions into older games;
- d) The near collapse of the resale market for used games;
- e) A 1982 tax law change, which lengthens the depreciable life of personal property used for business purposes (e.g., coin-operated games) from 3 years to 5 years;
- f) Growth of the home game installed base. (While this factor is not expected to seriously jeopardize the coin-op market, even in the long run, it will probably constrain a coin drop increase from the standard 25¢ to 50¢, much as television may have limited otherwise steeper movie admission prices.)

New game technologies offer manufacturers the opportunity for higher pricing, as long as game operators are assured adequate returns through higher per-play revenues. In the near term, the research costs and prototype development of such game forms may squeeze margins even more than the forecast 2%-3% in 1983. However, marketable product entries late in that year may begin providing margin relief to accommodate those expenditures.

Trends in Coin-Game Technology

Major game manufacturers are actively engaged in research aimed at enhancing realism and interactive participation in the play of the game. Such efforts typify the 10-year history of coin video games, which have developed from the small stick-figure emissions on black-and-white monitors that supplanted pinball games in traditional arcade spots, to today's large color screen displays of vividly animated, multi-background stories.



The realities of the coin-operated market -- which requires both a high rate of return to the operators, as well as underlying consumer appeal -- heavily influence the direction of game innovation. To this end, manufacturers seek to:

- 1) Improve operator revenue through higher coin drops, or
- 2) Aid productivity by reducing maintenance expenses and mechanical failures, or by providing less costly game conversion possibilities.

The types of games that have proven most dependable in the marketplace have been those that stimulate a high level of repeat play (again, a motion picture analogy) and a relatively fast rate of player turnover. Thus, drawn out strategy or fantasy games would not likely appeal to an operator unless he were assured that such a game could command consistently higher revenue. In the current uncertain environment, few operators are likely to experiment.

The major areas of present new game research are:

- 1) Enhanced graphics resolution -- The dazzling effects of coin video games are a function of (a) high-resolution display monitors, and (b) sufficient stored memory to create varied and changing visual fields. Newer games contain monitors with four times the pixel power of a standard television set, producing crisp multi-colored graphics effects. We expect continuing advances in monitor resolution, slowed only by rising development costs, until near photo-realism is achieved. Memory storage is similarly improving, and at probably more attractive price/performance efficiency trends than pixel power. Most coin games are powered by 24K-36K ROM memory, fed into 8-bit microprocessor-based logic boards. The next generation of games, including 16-bit and even 32-bit chips, is considered close at hand by many industry observers, and 64K ROM games are already beginning to appear on the market.
- 2) 3-D and holographic imagery -- Manufacturers are also exploring ways to create 3-dimensional visual effects. Sega's "SubRoc 3-D," which began shipping in October 1982, contains a special periscope lens that gives battlefields a 3-dimension sensation, and Stern's "Dark Planet" creates a unique spatial dimension in its lunar-like landscape. Other manufacturers are collaborating with computer design/special effects creators to develop solid object imagery which should begin appearing in coin games in 1983. The use of optical video disks is beginning to emerge also as a means of enhancing visual play fields (such as Sega's prototype, "Astron Beam").

Holographic images are created when a laser light beam is split between an illuminated object and a receptor film plate, setting up a combined light pattern that constitutes a ghost-like 3-dimensional effect. This technology is available today and is expected to become more commonly utilized as an enhancement to amusement games.

Cost factors for 3-D/holographic imagery represent perhaps 25%-35% increments over current game costs; video disk implementation would be appreciably more, probably doubling the cost of a standard video game. The real question is whether such enhancements will increase play sufficiently to justify the higher price tags to operators, especially since these features entail potentially higher maintenance burdens to the operators.

- 3) Voice synthesis/voice recognition -- Voice synthesis, by far the simpler technology, is appearing this fall in two home game systems Mattel's and Odyssey's, and will also be showing up in arcade games. ROM chips that store messages are accompanied by others that convert digital impulses to audio and also amplify sound. In all likelihood, voice synthesis, in the form of more powerful chip configurations, will be commonplace in games in 1983, but is not likely to play more than a supporting role in future video games.

A more advanced technology is voice recognition in which voice patterns and limited vocabularies can be computer-programmed and built into chips for "recognition" and command execution. Primarily utilized now for workplace productivity improvements, voice recognition will be tested in 1983 in coin games that will allow players to issue commands to the game. A low-performance, limited vocabulary system of this sort might add only \$50-\$75 in additional design and chip costs (on a high-volume basis), a level well within reach of manufacturers today.

- 4) Motion simulation -- Several manufacturers are known to be exploring means to superimpose the sensation of movement onto their games. Atari has been in discussion with Evans and Sutherland, a Utah-based designer of flight simulators and graphic displays for computer-aided design and manufacturing (CAD/CAM) systems. (Nolan Bushnell, founder of Atari and a former student of Dave Evans, is also exploring such technology for enhanced simulation games. His non-compete clause with Atari ends in October 1983.)

The problem with high-level simulation, at this stage, is cost. A flight simulator, typically custom-built for a commercial aircraft designer, might contain 100,000 standard integrated circuits and cost several million dollars. Until more advances in VLSI wafer technology can reduce the chip requirements through expanded memory storage, the expense of such implementation is considered prohibitive. Industry sources are doubtful that there will be major market entries employing highly sophisticated simulation technology before 1985; even then, such games may be priced beyond the means of the typical operator, and the manufacturer may elect to integrate them into larger family amusement centers.

Long-Term Directions

Ultimately, the direction in which coin games evolve will likely be influenced by the speed of increased computer memory storage, and by developments in such fields as robotics, computer-aided design and artificial intelligence.

It is also likely that coin games will experience segmentation distinctions in their evolution according to the nature of the different location types. Movie theaters, for example might be naturally suited to a hit movie video disk replication, while an airport might choose to install a flight simulation game, complete with a sit-in cockpit. (In this context, it will be interesting to observe Bally's degree of success with its new "Burger Time" game, licensed from Data East, in penetrating major hamburger restaurant chains. In this game, a location's menu items can actually be programmed onto the monitor.)

Games may also be adapted to different physical requirements: smaller portable games for use in barber shops or on airplanes; games built into solid wall structures for outdoor use or in public parks or depots; even mini-games built into vending machines. With greater manufacturing flexibility and efficiency, coin-operated game growth could well exceed our estimates.

Competitive Strategies -- Coin-Operated Video Game Market

Bally

Bally emerges as a consistent leader in this market. On the strength of its back-to-back blockbuster hits, "Pac-Man" (1981) and "Ms. Pac-Man" (1982), Bally has boosted its share from 29% in 1981 to 37% in 1982. Bally/Midway's video game sales are estimated at \$390 million for 1982, a 38% gain over the 1981 level, and the product will contribute about \$2.00 toward anticipated 1982 per share earnings of \$3.40. In the static market projected through our forecast period, Bally's size will enable it to develop and test the largest number of new game titles; it continues to hold licensed rights to the most powerful franchise property in the video game industry -- "Pac Man" and family, which can generate additional spinoff games (at least two are in production for 1983); and its fully integrated manufacturing facility should ensure its position as the industry's low-cost manufacturer, providing the greatest hedge in a declining margin business.

Other related Bally businesses augment Midway's coin-operated video game prospects:

- a) Distribution -- Bally's non-exclusive distribution operation accounted for nearly \$200 million in 1982 revenues, a 20% increase over the 1981 level, and approximately 8% of earnings. More significantly, Bally handles about one-third of the industry's units, and is in a position to exert some influence over the movement of Bally/Midway products, particularly in a sluggish market.
- b) Aladdin's Castles -- Bally is the largest single operator of video game arcades currently numbering about 400 in 45 states and representing nearly \$100 million in 1982 revenues. Though expansion will slow considerably from the 50% annual unit growth rate experienced in the past three years, Bally appears best positioned to continue building share in the troubled arcade market, at the expense of smaller, financially pressed operators. This arcade exposure offers several attractive extensions of Bally's video game manufacturing: a test market for new games; broadly distributed sites for relocation of slower earning games; cross-promotion with Bally's other family amusement center business, Six Flags; and consumer brand-building opportunity for its product line (including pinballs). While the market slowdown in 1982 eroded the traditionally high unit operating margins of 30%, Bally's greater efficiency in the operation of arcades should enable it to increase its earnings contribution from this area, even in a flat market.

c) Licensing - On the strength of its recent string of hit arcade games, Bally can begin to realize a sizable earnings flow from licenses to home game manufacturers (see Table 28). This opportunity should increase substantially in 1983, as CBS begins marketing cartridges as a licensee of Bally (Commodore similarly licenses Bally games for its VIC-20 personal computer and its MAX home game system).

d) New Product Technology - Bally's research in game technology is modest by Atari's standards, and its heavy reliance upon outside licenses may underscore some fundamental weakness in this area. However, one research path now being followed may prove to be an enormous winner for Bally -- video lottery games. These electronic terminals, interfaced with a touch-sensitive cathode ray tube monitor could represent a new generation in the public lottery business, with huge revenue potential. Public lotteries currently operate in 17 states and accounted for approximately \$4.0 billion in 1982 government revenues. (Bally's Scientific Games subsidiary operates the lotteries in 12 of those states with an approximate 85% share of the instant ticket market.) While the timing of this market evolution is uncertain, and appreciable earnings contributions are not anticipated before 1984, Bally's experience in both video games and lotteries would certainly establish it as the company to watch in this developing situation.

We have two main concerns about the Bally operations discussed above (excluding its Park Place casino). The first is Bally's continual reliance upon licensed coin games, which could constrain margins (due to royalty fees) even more than we have forecast over the long term. Second there is still uncertainty about the timing of high earnings growth from the Bally business lines that diversify away from the flattening video game market (which generated over 80% of the company's 1982 earnings).

Bally's strength as a low-cost, high-volume assembler should protect its leading share of the coin-operated replacement market. However, we feel that Bally is somewhat vulnerable to the rapid technology advances that could dramatically change the business by 1984-1985, developments more likely to come from Atari, Sega, or Nolan Bushnell himself.

Atari

Atari's 1982 performance was very disappointing, as the company gave up considerable market share ground to Bally (its share dropped from 25% to 19%). Absence of a major hit game ("Centipede" did best -- a respectable 50,000 units) and the "crowding out" effect of Bally's "Ms. Pac-Man" on the entire market caused Atari's units and revenues to slip 25%-30% from the 1981 level.

However, several factors point to a major rebound for Atari in 1983:

- a) A promising lineup of new games is planned, most notably "E.T." due out about midyear.
- b) A natural pendulum effect is anticipated to tone down Bally somewhat after its extraordinary 1982 performance, permitting Atari to regain some lost market share.

- c) Atari is undertaking a major effort to build stronger distributor ties. Although stopping short of setting up a formal distribution arm, as Bally has, Atari is expanding its sales support organization, providing operations and promotional support to independent distributors and wholesalers as a means of developing Atari product loyalty.
 - d) Extensive research in new game technologies should benefit Atari most directly over the long run. Atari is funding its total research effort (including consumer) at about \$100 million next year -- more than the rest of the industry combined. We anticipate games that incorporate a high degree of interactivity with the player -- creating a sense of great player control -- but not before 1984, when cost reductions make such implementation feasible.
- Apart from extensive internal development work, Atari has initiated very promising collaborations with several outside design sources including Lucasfilm and Evans and Sutherland. Together with other independent groups in California and Cambridge, Mass., these talent clusters represent some of the most innovative individuals in the field.
- e) Finally, Atari will probably explore new possibilities in the operation of game locations. Atari coin games are already in test with a major fast food chain, and there are indications that a new proposal for family entertainment centers is being examined now. Atari now operates 33 Malibu Grand Prix centers, which include arcades around the country, and a supplement to this activity might well be in the theme park concept area, like Bally's Six Flags or Aladdin's Castle operations.

An Atari rebound could easily result in units growth of 20%-25% over the 1982 level (assuming only a modest "hit" contribution of 50,000 units from "E.T."). On this basis, Atari should achieve about a 25% share of market, and contribute \$0.50 per share toward WCI's 1983 earnings.

More significantly, however, Atari's position as the coin game's top innovator is setting in place a springboard for strong market positioning in the 1984-1986 period, when new game technologies will begin differentiating manufacturers to a far greater extent than is the present case.

Other Vendors

Sega

Sega Enterprises, a 90%-owned subsidiary of Gulf and Western, with an R&D base in Japan, is an innovative company with strong potential for market share growth. Together with its acquired partner, Gremlin Industries, Sega has produced several firsts in the industry: the first microprocessor-based game in 1975 ("Rodeo"), the first multiphase game that contained different levels of game playing difficulty ("Head On" - 1979), and, more recently, the first use of an X-Y color vector scan monitor in the 1981 "Space Fury" game. In late 1982, Sega produced prototypes for both a 3-dimensional game, "SubRoc 3D," and a video disk game, "Astron Beam." Sega's games are noted for their graphic excellence and novelty ("Zaxxon" and "Turbo" are two outstanding examples), and the company could well combine these talents to achieve higher, mid-teen market share over the forecast period.

Sega also dominates the market for convertible kits. Though a small (less than 5%) segment of the total market, a few key hit games in convertible format could position Sega strongly for growth from this second-tier business line.

Gulf and Western's ownership position in Sega may also represent new opportunities and directions for the game manufacturer. As Hollywood films are increasingly being adapted to coin games, G & W's Paramount Division may play a larger role in new game concepts. In addition, Paramount Home Video may find Sega's arcade licenses attractive enough to begin marketing them as home game cartridges, a product line enjoyed now by licensee Coleco.

Williams Electronics

Williams Electronics like Bally/Midway, is another major contender that graduated from the ranks of the faltering pinball business. It bolted into coin-op in 1980 with a huge hit, "Defender," which alone yielded the company \$110.0 million in revenues and \$2.51 per share in profits the following year. A sequel, called "Stargate," did about half as well in units, and, together with "Robotron," produced a disappointing 40,000-unit year for Williams in 1982, and a 15% decline in per share earnings, to \$2.12.

Williams is perhaps the premier "shoot-em" game developer, a favorite with heavy arcaders. We expect the company to maintain its franchise in this game niche, as it seeks also to broaden it with whimsical games like "Joust," which it began shipping at very successful levels in late fall 1982. Williams is considered a very capable game manufacturer, and its coin-operated game successes are expected to yield healthy earnings contributions from home game cartridge licenses. The only lingering concern is that the flat coin-op market may cause Williams to diversify out, as its recent purchase of a 25% stake in the Sands Hotel in Atlantic City (Greate Bay Casino Corp.) may suggest.

Nintendo and Taito

Nintendo and Taito are U.S. manufacturing and distribution arms of Japanese game developers. Nintendo has really been a one-game success thus far ("Donkey Kong"); its future potency is still uncertain, although a sequel to "Donkey Kong" ("Jr.") is off to a fast start, as is its newest entry, "Popeye." Taito has developed several moderately successful titles, and seems to be better rounded from a product development standpoint. For this reason, a solid, if unspectacular, track record with "minor" hits could well ensure Taito of significant, growing share of market.

WARNER COMMUNICATIONS, INC.

FINANCIAL PERFORMANCE

TABLE 31
WCI Revenue and Earnings Forecast
(\$ million except E.P.S.)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Ann. Comp. Growth Rate 1977-82 1982-86
Operating Revenue											
Consumer Electronics	\$ 150.2	\$ 177.9	\$ 238.1	\$ 312.7	\$ 1,227.1	\$ 1,940.0	\$ 2,300.0	\$ 2,900.0	\$ 3,400.0	\$ 3,950.0	67%
Recorded Music	532.4	617.1	725.3	805.9	811.3	760.0	870.0	885.0	700.0	720.0	7%
Filmed Entertainment	353.2	393.1	609.7	668.9	755.1	750.0	800.0	850.0	875.0	900.0	16%
Direct Response	92.2	95.1	74.9	72.0	359.4	425.0	470.0	550.0	600.0	650.0	11%
Publishing	\$1,066.1	\$1,243.1	\$1,648.0	\$2,059.4	\$3,237.2	\$3,560.0	\$4,327.5	\$5,000.0	\$5,852.0	\$6,505.0	10%
Total Revenue											30%
Operating Margins											13%
Consumer Electronics	15.8	15.0	2.0	13.4	23.3	19.2	19.1	18.5	17.1	16.0	19%
Recorded Music	16.4	20.3	19.3	9.0	3.3	13.3	12.0	12.3	13.1	13.3	7%
Filmed Entertainment	13.0	17.4	24.0	15.0	17.7	12.9	16.0	16.0	16.0	16.0	5%
Publishing	13.1	14.4	13.6	10.9	13.7	14.3	14.2	14.6	13.9	13.7	11%
Overall Margin											13.7%
Operating Income											
Consumer Electronics	\$ (6.1)	\$ (2.7)	\$ 6.3	\$ 89.9	\$ 286.6	\$ 373.2	\$ 400.0	\$ 537.0	\$ 500.0	\$ 640.5	n.m.
Recorded Music	84.0	92.6	81.7	82.9	85.0	58.1	33.5	37.5	45.5	50.5	(7)
Filmed Entertainment	58.0	79.6	117.6	60.8	24.7	100.0	96.5	104.5	115.0	120.0	12
Direct Response	7.2	9.6	18.1	10.7	14.9	24.0	32.0	50.0	57.0	65.0	15
Publishing	\$ 143.1	\$ 179.4	\$ 223.6	\$ 226.4	\$ 442.2	\$ 566.3	\$ 616.0	\$ 744.2	\$ 814.0	\$ 893.5	32%
Operating Income											12%
Interest, Dividend & Unallocated	\$ (39.8)	\$ (50.6)	\$ (58.6)	\$ (33.3)	\$ (77.0)	\$ (140.0)	\$ (130.0)	\$ (125.0)	\$ (100.0)	\$ (50.0)	
PreTax Income	\$ 103.3	\$ 128.8	\$ 165.0	\$ 191.2	\$ 365.2	\$ 426.3	\$ 486.0	\$ 616.2	\$ 714.0	\$ 843.5	
Tax rate											
Income from Operations	\$ (39.1)	\$ (46.0)	\$ (50.0)	\$ (34.0)	\$ (130.7)	\$ (106.3)	\$ (104.5)	\$ (247.7)	\$ (285.6)	\$ (337.4)	40%
from Discon't'd Cable TV Sale	\$ 67.2	\$ 82.3	\$ 109.0	\$ 137.1	\$ 226.5	\$ 260.0	\$ 291.5	\$ 371.5	\$ 420.4	\$ 508.1	
Net Income											
Net Income	\$ 71.1	\$ 87.4	\$ 200.7	\$ 137.1	\$ 226.5	\$ 260.0	\$ 291.5	\$ 371.5	\$ 420.4	\$ 508.1	30%
Share Outstanding											
Earnings per Share	\$ 1.39	\$ 1.65	\$ 3.63	\$ 2.38	\$ 3.57	\$ 4.00	\$ 4.50	\$ 5.70	\$ 6.60	\$ 7.80	10%
(by Division)											
Consumer Electronics	\$ (0.06)	\$ (0.02)	\$ 0.06	\$ 0.74	\$ 2.32	\$ 2.94	\$ 3.48	\$ 4.25	\$ 4.70	\$ 5.50	n/m
Recorded Music	0.82	0.86	0.73	0.88	0.88	0.45	0.27	0.30	0.37	0.43	17%
Filmed Entertainment	0.37	0.73	1.02	0.64	0.21	0.80	0.77	0.83	0.93	1.03	(1)
Direct Response	0.07	0.08	0.16	0.12	0.25	0.20	0.25	0.30	0.40	0.50	7
Publishing	0.07	0.08	0.16	0.12	0.25	0.20	0.25	0.30	0.40	0.50	30
Unallocated Portion - Warner Amex											17
Total	\$ 1.35	\$ 1.65	\$ 3.63	\$ 2.38	\$ 3.57	\$ 4.00	\$ 4.50	\$ 5.70	\$ 6.60	\$ 7.80	10%

Source: Corporate reports and Bernstein estimates.

(1/31)

TABLE 32
Atari Unit Forecast by Product
(in millions, except where noted)

	1980	1981	1982E	1983E	1984E	1985E	1986E
<u>U.S. - Consumer Division</u>							
VCS Consoles	1.0	3.1	4.5	2.5	1.5	1.0	-
5200 Consoles	-	-	0.3	1.5	1.2	0.8	0.7
Other Consoles	-	-	-	0.2	1.0	1.2	1.8
Subtotal	1.0	3.1	4.8	4.2	3.7	3.0	2.5
VCS Cartridges	6.5	21.0	30.0	32.0	27.0	20.0	15.0
5200 Cartridges	-	-	1.5	7.5	10.0	12.0	10.0
Other Game Software	-	-	-	4.5	11.0	15.0	21.0
Subtotal	6.5	21.0	31.5	44.0	48.0	47.0	46.0
<u>Non-U.S.</u>							
Consoles	0.2	0.6	1.0	2.0	2.5	3.0	3.0
Cartridges (VCS and 5200)	0.6	1.5	4.0	8.0	15.0	23.0	30.0
<u>Home Computer Division (000's)</u>							
U.S.							
400	15	55	250	350	300	250	200
800	8	40	175	275	375	300	300
1200 and Other	-	-	-	75	200	350	500
Subtotal	23	95	425	775	800	900	1,000
Non-U.S.	-	-	25	100	200	300	400
All Models	-	-	450	875	1,000	1,200	1,400
<u>Coin-Operated Games (000's)</u>							
U.S. and Non-U.S.	90	120	90	115	140	155	170

Source: Bernstein estimates.

(1/32)

TABLE 33
Atari Revenues by Product Category
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Ann. Comp. Growth Rate 1977-82 1982-86E
Consumer Video (U.S.)											
Basic (VCS) Console	\$ 40.0	\$ 51.0	\$ 75.5	\$ 110.0	\$ 340.0	\$ 495.0	\$ 225.0	\$ 120.0	\$ 80.0	\$ 80.0	
Deluxe (5200) Console	-	-	-	-	-	50.0	210.0	120.0	80.0	80.0	
Other Consoles	-	-	-	-	-	-	24.0	120.0	132.0	180.0	
Sub-Total	\$ 40.0	\$ 51.0	\$ 75.5	\$ 110.0	\$ 340.0	\$ 545.0	\$ 459.0	\$ 360.0	\$ 292.0	\$ 260.0	68%
VCS Cartridges	\$ 12.5	\$ 31.3	\$ 43.8	\$ 93.6	\$ 301.8	\$ 456.5	\$ 460.0	\$ 351.0	\$ 250.0	\$ 180.0	
2000 Cartridges	-	-	-	-	-	112.5	140.0	156.0	122.5	122.5	
Other Game Software	-	-	-	-	-	24.5	60.0	150.0	195.0	257.5	
Sub-Total	\$ 12.5	\$ 31.3	\$ 43.8	\$ 93.6	\$ 301.8	\$ 481.0	\$ 632.5	\$ 641.0	\$ 601.0	\$ 560.0	10%
Total - Consumer (U.S.)	\$ 52.5	\$ 82.3	\$ 119.3	\$ 203.6	\$ 641.8	\$ 1,026.0	\$ 1,091.5	\$ 1,001.0	\$ 893.0	\$ 820.0	(5)%
Consumer Video (Non-U.S.)											
Consoles	\$ n/m	\$ n/m	\$ 3.0	\$ 18.0	\$ 72.0	\$ 120.0	\$ 225.0	\$ 280.0	\$ 285.0	\$ 287.5	19%
Cartridges	\$ n/m	\$ n/m	2.0	12.0	24.5	70.0	115.0	200.0	291.5	362.5	41%
Other	\$ n/m	\$ n/m	-	-	-	10.0	10.0	25.0	100.0	150.0	-
Total - Consumer (Non-U.S.)	\$ n/m	\$ n/m	\$ 5.0	\$ 30.0	\$ 96.5	\$ 200.0	\$ 350.0	\$ 505.0	\$ 676.5	\$ 800.0	n/m
Coin-Operated Video	\$ 34.0	\$ 36.0	\$ 50.9	\$ 171.0	\$ 242.2	\$ 189.0	\$ 264.5	\$ 350.5	\$ 410.0	\$ 460.0	41%
Personal Computers											
Model 400	\$ -	\$ -	\$ -	\$ 6.0	\$ 22.0	\$ 62.5	\$ 70.0	\$ 80.0	\$ 50.0	\$ -	
Model 800	-	-	-	5.0	25.5	102.5	125.0	130.0	100.0	90.0	
Model 1200 and Others	-	-	-	-	-	40.0	40.0	85.0	130.0	175.0	
Software & Peripherals	-	-	-	9.0	50.0	160.0	240.0	400.0	550.0	675.0	
U.S. Computer Rev.	\$ -	\$ -	\$ -	\$ 20.0	\$ 97.5	\$ 325.0	\$ 475.0	\$ 675.0	\$ 830.0	\$ 940.0	33%
Non-U.S. Computer	\$ -	\$ -	\$ -	\$ 20.0	\$ 97.5	20.0	50.0	80.0	150.0	200.0	24%
Total - Computer	\$ -	\$ -	\$ -	\$ 20.0	\$ 97.5	\$ 345.0	\$ 525.0	\$ 755.0	\$ 980.0	\$ 1,140.0	n/m
Other	\$ 24.0	\$ 5.5	\$ -	\$ -	\$ -	\$ -	\$ 35.0	\$ 280.0	\$ 350.0	\$ 500.0	27%
Total Revenue	\$111.3	\$123.8	\$175.2	\$424.6	\$1,078.0	\$1,760.0	\$2,231.0	\$2,821.5	\$3,309.5	\$3,720.0	74%
% Change	-	11%	41%	14%	154%	63%	27%	26%	17%	12%	30%

Memo: Consumer Electronics Division includes Atari, Knickerbocker Toy (until 1983, when principal assets will be transferred to Hasbro Toy Company in exchange for 40% equity in Hasbro), and Malibu Grand Prix amusement centers.

n/m - not meaningful.

Source: Bernstein estimates.

(1/33)

TABLE 33
Atari Revenues by Product Category
(\$ million)

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											1977-82	1982-86E
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Basic (VCS) Console	\$ 40.8	\$ 51.0	\$ 75.5	\$ 110.0	\$ 340.0	\$ 495.0	\$ 225.0	\$ 120.0	\$ 80.0	\$ 80.0		
Deluxe (5200) Console	-	-	-	-	-	50.0	210.0	120.0	80.0	180.0		
Other Consoles	-	-	-	-	-	-	24.0	120.0	132.0	260.0		(17)%
Sub-Total	\$ 40.8	\$ 51.0	\$ 75.5	\$ 110.0	\$ 340.0	\$ 545.0	\$ 459.0	\$ 360.0	\$ 292.0	\$ 260.0		
VCS Cartridges	\$ 12.5	\$ 31.3	\$ 43.8	\$ 93.6	\$ 301.8	\$ 456.5	\$ 480.0	\$ 351.0	\$ 250.0	\$ 180.0		
5200 Cartridges	-	-	-	-	-	24.5	112.5	140.0	156.0	122.5		
Other Game Software	-	-	-	-	-	-	60.0	150.0	195.0	257.5		
Sub-Total	\$ 12.5	\$ 31.3	\$ 43.8	\$ 93.6	\$ 301.8	\$ 481.0	\$ 652.5	\$ 641.0	\$ 601.0	\$ 560.0	10%	4
Total - Consumer (U.S.)	\$ 53.3	\$ 82.3	\$ 119.3	\$ 203.6	\$ 641.8	\$ 1,026.0	\$ 1,091.5	\$ 1,001.0	\$ 893.0	\$ 820.0	11%	(75)%
Consumer Video (Non-U.S.)												
Consoles	\$ n/m	\$ n/m	\$ 3.0	\$ 18.0	\$ 72.0	\$ 120.0	\$ 225.0	\$ 280.0	\$ 285.0	\$ 287.5	19%	
Cartridges	n/m	n/m	2.0	12.0	24.5	70.0	115.0	200.0	291.5	362.5	41	
Other	n/m	n/m	-	-	-	10.0	10.0	25.0	100.0	150.0	-	
Total - Consumer (Non-U.S.)	\$ n/m	\$ n/m	\$ 5.0	\$ 30.0	\$ 96.5	\$ 200.0	\$ 350.0	\$ 505.0	\$ 676.5	\$ 800.0	n/m	40%
Total - Consumer (U.S. & Non-U.S.)	\$ 34.0	\$ 36.0	\$ 50.9	\$ 171.0	\$ 242.2	\$ 189.0	\$ 264.5	\$ 360.5	\$ 410.0	\$ 460.0	41%	25%
Coin-Operated Video												
Personal Computers												
Model 100	\$ -	\$ -	\$ -	\$ 8.0	\$ 22.0	\$ 62.5	\$ 70.0	\$ 80.0	\$ 50.0	\$ -		
Model 800	-	-	-	5.0	25.5	102.5	125.0	130.0	100.0	90.0		
Model 1200 and Others	-	-	-	-	-	-	40.0	85.0	130.0	175.0		
Software & Peripherals	-	-	-	9.0	50.0	160.0	240.0	400.0	550.0	675.0	n/m	33
U.S. Computer Rev.	-	-	-	\$ 20.0	\$ 87.5	\$ 325.0	\$ 475.0	\$ 675.0	\$ 830.0	\$ 940.0	n/m	24%
Non-U.S. Computer	-	-	-	-	-	20.0	50.0	80.0	150.0	200.0	n/m	
Total - Computer	\$ -	\$ -	\$ -	\$ 20.0	\$ 97.5	\$ 345.0	\$ 525.0	\$ 755.0	\$ 980.0	\$ 1,140.0	n/m	27%
Other	\$ 24.0	\$ 5.5	\$ -	\$ -	\$ -	\$ -	\$ 35.0	\$ 200.0	\$ 350.0	\$ 500.0		
Total Revenue	\$111.3	\$123.8	\$175.2	\$424.6	\$1,078.0	\$1,760.0	\$2,231.0	\$2,821.5	\$3,309.5	\$3,720.0	74%	30%
% Change	-	11%	41%	14%	154%	83%	27%	26%	17%	12%		

Memo: Consumer Electronics Division includes Atari, Knickerbocker Toy (until 1983, when principal assets will be transferred to Hasbro Toy Company in exchange for 40% equity in Hasbro), and Malibu Grand Prix amusement centers.

n/m - not meaningful.

Source: Bernstein estimates.

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TABLE 34
Atari Earnings by Product Category
(\$ million)

	1977	1978	1979	1980	1981	1982F	1983F	1984F	1985F	1986F
Consumer Video (U.S.)										
VCS Console	\$ n.m.	\$ 1.0	\$ 10.0	\$ 42.0	\$ 142.5	\$ 235.0	\$ 85.0	\$ 32.0	\$ 20.0	\$ -
5200 Console	-	-	-	-	-	10.0	90.0	40.0	24.0	16.0
Other Consoles	-	-	-	-	-	-	-	48.0	43.5	49.0
Subtotal	\$ n.m.	\$ 1.0	\$ 10.0	\$ 42.0	\$ 142.5	\$ 245.0	\$ 175.0	\$ 120.0	\$ 87.5	\$ 65.0
VCS Cartridges										
5200 Cartridges	n.m.	4.3	16.3	43.4	151.5	725.0	193.5	140.0	95.0	65.0
Other Game Software	-	-	-	-	-	7.5	51.5	56.0	58.0	43.2
Subtotal	\$ n.m.	\$ 4.3	\$ 16.3	\$ 43.4	\$ 151.5	\$ 732.5	\$ 245.0	\$ 260.0	\$ 227.0	\$ 200.5
Total - Consumer (U.S.)	\$ 0.4	\$ 5.3	\$ 26.3	\$ 85.4	\$ 294.0	\$ 477.5	\$ 420.0	\$ 380.0	\$ 314.5	\$ 265.5
Consumer Video (Non-U.S.)										
Consoles	-	n.m.	n.m.	\$ 3.0	\$ 13.5	\$ 27.0	\$ 76.0	\$ 96.0	\$ 90.0	\$ 80.0
Cartridges	-	n.m.	n.m.	2.0	7.5	25.0	50.0	84.0	120.0	130.0
Other	-	n.m.	n.m.	-	-	-	-	-	30.0	50.0
Total - Consumer (Non-U.S.)	-	n.m.	n.m.	\$ 5.0	\$ 21.0	\$ 52.0	\$ 126.0	\$ 180.0	\$ 240.0	\$ 260.0
Coin-Operated Video										
	\$ 8.5	\$ 9.0	\$ 14.0	\$ 54.5	\$ 80.5	\$ 50.0	\$ 74.1	\$ 97.0	\$ 105.5	\$ 115.0
Personal Computers (U.S.)										
Model 400	-	-	-	-	-	-	\$ 5.0	\$ 7.0	\$ 5.0	\$ -
Model 800	-	-	-	-	-	-	15.0	20.0	25.0	20.0
Model 1200, et al.	-	-	-	-	-	-	(20.0)	1.0	15.0	45.0
Software, Peripherals	-	-	-	-	-	-	25.0	60.0	120.0	165.0
Subtotal	-	-	-	-	-	-	25.0	88.0	165.0	230.0
Non-U.S.	-	-	-	-	-	-	-	5.0	15.0	20.0
Total Computer	-	-	\$(10.0)	\$(25.0)	\$(20.0)	\$(10.0)	\$ 25.0	\$ 93.0	\$ 175.0	\$ 250.0
Other (Incl. Kickerbocker)										
Total	\$ 8.9	\$ 14.3	\$ 30.3	\$ 114.9	\$ 381.5	\$ 539.5	\$ 630.0	\$ 800.0	\$ 935.0	\$ 1,040.5
S.G.A.A. Other Expenses	15.0	17.0	24.0	45.0	100.0	150.0	190.0	263.0	355.0	400.0
Operating Earnings	\$ (6.1)	\$ (2.7)	\$ 6.3	\$ 68.0	\$ 281.5	\$ 389.5	\$ 440.0	\$ 537.0	\$ 580.0	\$ 640.5
% change	-	-	-	n.m.	314%	38%	13%	22%	8%	10%

Source: Corporate reports and Bernstein estimates.

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TABLE 35
Atari Margin Forecast, by Product Category

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
<u>Consumer Video (U.S.)</u>										
VCS Console	n.m.	2%	13%	38%	42%	47%	38%	27%	25%	- %
5200 Console	-	-	-	-	-	-	43	33	30	20
Other Consoles	-	-	-	-	-	-	-	37	33	27
Subtotal	n.m.	2%	13%	38%	42%	45%	38%	33%	30%	25%
VCS Cartridges	n.m.	14%	37%	45%	50%	50%	42%	40%	38%	36%
5200 Cartridges	-	-	-	-	-	35	43	40	37	36
Other Game Software	-	-	-	-	-	-	40	40	37	36
Subtotal	n.m.	14%	37%	45%	50%	49%	42%	40%	37%	36%
Consumer Video (U.S.)	2%	6%	22%	42%	46%	47%	39%	38%	35%	32%
<u>Consumer Video (Non-U.S.)</u>										
Consoles	-	-	-	17%	19%	22%	34%	34%	32%	28%
Cartridges	-	-	-	17	31	36	44	42	40	36
Other	-	-	-	-	-	-	-	-	30	33
Total - Consumer (Non-U.S.)	-	-	-	17%	22%	26%	36%	36%	35%	33%
<u>Coin-Operated Video</u>	25%	25%	28%	32%	33%	26%	28%	27%	26%	25%
<u>Personal Computers</u>										
(U.S.) Model 400	-	-	-	-	-	-	7%	12%	10%	-%
Model 800	-	-	-	-	-	-	12	15	25	22
Model 1200 & others	-	-	-	-	-	-	-	-	12	25
Software, Peripherals	-	-	-	-	-	-	10	15	22	25
Subtotal	-	-	-	-	-	-	5%	13%	20%	25%
Non-U.S.	-	-	-	-	-	-	-	6	10	10
Total	-	-	-	-	-	-	5%	12%	18%	22%
<u>Other (Incl. Knickerbocker)</u>	-	-	-	-	-	-	15%	25%	30%	30%
S.G.&A., Other Expenses (as % of Revenue)	10%	14%	14%	11%	9%	10%	9%	9%	11%	11%
Operating Earnings	-	-	3.6%	16.0%	26.1%	22.1%	19.7%	19.0%	17.2%	16.5%
n.m. - not meaningful.										
Source: Bernstein estimates.										(1/35)

TABLE 36
Atari Earnings by Product Category, as % of Total

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E
<u>Consumer Video (U.S.)</u>										
VCS Console	2%	7%	25%	29%	36%	44%	13%	4%	2%	-%
5200 Console	-	-	-	-	-	2	15	5	3	2
Other Consoles	-	-	-	-	-	-	-	6	5	5
Subtotal	2%	7%	25%	29%	36%	46%	28%	15%	10%	7%
VCS Cartridges	2%	31%	40%	30%	38%	42%	28%	19%	10%	6%
5200 Cartridges	-	-	-	-	-	1	8	7	6	4
Other Game Software	-	-	-	-	-	-	n.m.	7	8	9
Subtotal	2%	31%	40%	30%	38%	43%	36%	34%	24%	19%
Total - Consumer (U.S.)	4%	38%	65%	59%	74%	89%	64%	48%	34%	26%
<u>Consumer Video (Non U.S.)</u>										
Consoles	n.m.	n.m.	n.m.	2%	3%	5%	12%	12%	10%	8%
Cartridges	n.m.	n.m.	n.m.	1	2	5	7	10	13	12
Other	n.m.	n.m.	n.m.	-	-	-	-	-	3	5
Total - Consumer (Non U.S.)	n.m.	n.m.	n.m.	3%	5%	10%	19%	22%	26%	25%
<u>Coin-Operated Video</u>	96%	62%	35%	38%	20%	9%	12%	12%	11%	11%
<u>Personal Computers</u>										
(U.S.) Model 400	-	-	-	-	-	-	1%	1%	1%	-%
Model 800	-	-	-	-	-	-	5	3	3	2
Model 1200, et al.	-	-	-	-	-	-	4	0	2	4
Software, Peripherals	-	-	-	-	-	-	2	7	13	16
U.S. - Subtotal	-	-	-	-	-	-	4%	11%	18%	22%
Non U.S. Subtotal	-	-	-	-	-	-	-	1	2	2
Total Computer	-	-	-	-	-	-	4%	12%	19%	24%
<u>Other (Incl. Knickerbocker)</u>	-	-	-	-	1%	-	1%	6%	11%	14%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Discrepancies due to rounding.

Source: Bernstein estimates

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TABLE 37
Warner Communications, Inc.
Quarterly Revenue and Earnings Forecast

	1980	1981	1982E	1983E		1980	1981	1982E	1983E
Sales					% Increase				
1st Qtr.	\$ 427.0	\$ 602.1	\$ 932.5	\$1,005.0	1st Qtr.	(1.8)%	41.0%	54.9%	7.8%
2nd Qtr.	449.9	676.3	907.0	965.0	2nd Qtr.	29.3	15.0	34.2	6.4
3rd Qtr.	527.7	872.3	1,027.8	1,107.0	3rd Qtr.	33.4	65.3	17.8	7.7
4th Qtr.	654.8	1,086.5	1,093.2	1,250.5	4th Qtr.	39.9	65.9	0.6	14.4
Total	\$2,059.4	\$3,237.2	\$3,960.0	\$4,327.5	Total	24.9%	57.2%	22.3%	9.3%
Cost of Sales, S.G. & A.					% Sales				
1st Qtr.	\$ 369.1	\$ 511.0	\$ 776.2	\$ 859.7	1st Qtr.	86.4%	84.9%	83.2%	85.5%
2nd Qtr.	403.5	594.7	753.1	818.4	2nd Qtr.	89.7	87.9	83.0	84.8
3rd Qtr.	476.1	753.9	866.6	935.7	3rd Qtr.	90.2	86.4	84.3	84.5
4th Qtr.	586.2	935.5	977.4	1,060.5	4th Qtr.	89.5	86.1	89.4	84.8
Total	\$1,835.0	\$2,795.0	\$3,372.8	\$3,674.3	Total	89.1%	86.3%	85.2%	84.9%
Operating Income					Operating Margin				
1st Qtr.	\$ 57.9	\$ 91.1	\$ 156.3	\$ 145.3	1st Qtr.	13.6%	15.1%	16.8%	14.5%
2nd Qtr.	46.4	81.6	153.9	146.6	2nd Qtr.	10.3	12.1	17.0	15.2
3rd Qtr.	51.6	118.4	161.2	171.3	3rd Qtr.	9.8	13.6	15.7	15.5
4th Qtr.	68.6	151.0	115.8	190.0	4th Qtr.	10.5	13.9	10.6	15.2
Total	\$ 224.4	\$ 442.2	\$ 587.2	\$ 653.2	Total	10.9%	13.7%	14.8%	15.1%
S.G. & A.					% Sales				
1st Qtr.	\$ 10.3	\$ 11.6	\$ 17.4	\$ 21.5	1st Qtr.	2.4%	1.9%	1.9%	2.1%
2nd Qtr.	10.0	13.1	18.6	20.8	2nd Qtr.	2.0	1.9	2.1	2.2
3rd Qtr.	10.7	15.5	19.4	22.4	3rd Qtr.	2.0	1.8	1.9	2.0
4th Qtr.	11.0	18.8	21.0	23.0	4th Qtr.	1.7	1.7	1.8	1.8
Total	\$ 42.0	\$ 59.0	\$ 76.4	\$ 87.7	Total	2.0%	1.8%	1.9%	2.0%
Interest Expense					% Sales				
1st Qtr.	\$ 8.3	\$ 11.7	\$ 19.5	\$ 22.0	1st Qtr.	1.9%	1.9%	2.1%	2.2%
2nd Qtr.	8.5	13.6	24.8	27.0	2nd Qtr.	1.9	2.0	2.7	2.8
3rd Qtr.	8.0	22.4	25.6	27.7	3rd Qtr.	1.5	2.6	2.5	2.5
4th Qtr.	11.3	21.9	29.5	35.0	4th Qtr.	1.7	2.0	2.7	2.8
Total	\$ 36.2	\$ 69.6	\$ 99.4	\$ 111.7	Total	1.8%	2.2%	2.5%	2.6%
Dividend & Interest Income					% Sales				
1st Qtr.	\$ 14.9	\$ 12.7	\$ 10.9	\$ 12.0	1st Qtr.	3.5%	2.1%	1.2%	1.2%
2nd Qtr.	10.4	14.3	2.8	4.0	2nd Qtr.	2.3	2.1	0.3	0.2
3rd Qtr.	10.4	14.4	8.9	8.8	3rd Qtr.	2.0	1.7	0.9	0.2
4th Qtr.	9.2	10.2	7.6	7.2	4th Qtr.	1.4	0.9	0.7	0.2
Total	\$ 44.9	\$ 51.7	\$ 30.2	\$ 32.0	Total	2.2%	1.6%	0.8%	0.7%
Pretax Income					% Sales				
1st Qtr.	\$ 54.2	\$ 80.5	\$ 130.2	\$ 113.8	1st Qtr.	12.7%	13.4%	14.0%	11.3%
2nd Qtr.	38.2	69.2	113.3	102.8	2nd Qtr.	8.5	10.2	12.5	10.7
3rd Qtr.	43.3	95.0	125.0	130.0	3rd Qtr.	8.2	10.9	11.5	11.7
4th Qtr.	55.5	120.5	57.7	139.2	4th Qtr.	8.5	11.1	5.3	11.7
Total	\$ 191.2	\$ 365.2	\$ 426.2	\$ 485.8	Total	9.3%	11.3%	10.8%	11.2%
Taxes					Tax Rate				
1st Qtr.	\$ 19.2	\$ 31.0	\$ 52.3	\$ 45.5	1st Qtr.	35.4%	38.5%	40.2%	40.0%
2nd Qtr.	12.6	26.6	45.1	41.1	2nd Qtr.	33.0	38.5	39.8	40.0
3rd Qtr.	11.4	36.4	46.3	52.0	3rd Qtr.	26.3	38.3	37.0	40.0
4th Qtr.	10.9	44.7	22.5	55.7	4th Qtr.	19.6	37.1	39.0	40.0
Total	\$ 54.1	\$ 138.7	\$ 166.3	\$ 194.5	Total	28.3%	38.0%	39.0%	40.0%
Net Income					% Sales				
1st Qtr.	\$ 35.0	\$ 49.5	\$ 77.8	\$ 68.3	1st Qtr.	8.2%	8.2%	8.3%	6.5%
2nd Qtr.	25.6	42.5	68.2	61.7	2nd Qtr.	5.7	6.3	7.5	6.4
3rd Qtr.	31.9	58.6	78.7	78.0	3rd Qtr.	6.0	6.7	7.7	7.0
4th Qtr.	44.6	75.8	35.2	83.5	4th Qtr.	6.8	7.0	3.2	6.7
Total	\$ 137.1	\$ 276.5	\$ 260.0	\$ 291.5	Total	6.7%	7.0%	6.6%	6.5%
Earnings Per Share					% Income				
1st Qtr.	\$ 0.62	\$ 0.81	\$ 1.20	\$ 1.05	1st Qtr.	6.8%	30.6%	48.1%	(12.5)%
2nd Qtr.	0.45	0.66	1.05	0.95	2nd Qtr.	18.4	46.7	59.1	(9.5)%
3rd Qtr.	0.55	0.91	1.21	1.20	3rd Qtr.	25.0	65.5	33.0	(10.0)%
4th Qtr.	0.76	1.17	0.54	1.30	4th Qtr.	28.8	53.9	(53.8)	12.5%
Total	\$ 2.38	\$ 3.57	\$ 4.00	\$ 4.50	Total	20.8%	50.0%	12.0%	12.5%

- Increase of 4th quarter and full year 1980 e.p.s. over 1979 excludes gain on sale of 50% of cable television operations to American Express.

Source: Corporate reports and Bernstein estimates.

(137,074)

COLECO INDUSTRIES
FINANCIAL PERFORMANCE

TABLE 3B
Coleco Industries
Revenue and Earnings by Product Category
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Compound Annual Growth Rate 1977-82	1982-86E
Operating Revenues												
Electronics	\$ 71.8	\$ 38.8	\$ 63.9	\$ 90.4	\$ 58.1	\$ 341.0	\$ 550.0	\$ 601.0	\$ 675.5	\$ 707.0	36%	20%
Toys and Games	18.7	21.0	23.7	20.8	26.9	22.5	27.0	30.0	35.0	45.0	4	19
Ride-On Vehicles	-	-	0.4	1.9	24.9	38.0	45.0	50.0	57.0	65.0	-	13
Swimming Pools	46.5	47.1	48.5	48.8	68.1	70.0	78.5	88.0	94.0	100.0	9	9
Net Revenues	\$137.1	\$107.0	\$136.5	\$162.9	\$178.0	\$471.7	\$700.5	\$769.0	\$861.5	\$917.0	28%	17%
Operating Margin												
Electronics	4.0%	(59.0)%	15.3%	22.1%	7.2%	20.8%	17.3%	15.1%	14.0%	13.8%		
Toys and Games	7.5	8.0	8.4	8.5	9.3	7.0	8.5	8.3	8.2	8.4		
Ride-On Vehicles	-	-	-	-	15.0	16.0	16.0	15.7	15.3	15.0		
Swimming Pools	3.0	3.6	10.5	10.2	10.4	10.5	10.6	10.8	10.9	11.0		
Overall Margin	5.1%	-	12.2%	16.5%	9.9%	18.1%	16.4%	14.4%	13.4%	13.3%		
Operating Income												
Electronics	\$ 2.9	\$(22.9)	\$ 9.8	\$ 20.0	\$ 4.2	\$ 70.8	\$ 95.1	\$ 90.8	\$ 93.7	\$ 97.5	8%	8%
Toys and Games	1.4	1.7	2.0	1.8	2.5	1.6	2.3	2.5	2.9	3.8	3	24
Ride-On Vehicles	-	-	(0.2)	-	3.8	6.0	7.6	7.8	8.7	9.7	-	11
Swimming Pools	2.3	1.7	5.1	5.1	7.1	7.0	8.3	9.5	10.2	11.0	28	8
Operating Income	\$ 6.6	\$(19.5)	\$ 16.7	\$ 26.9	\$ 17.6	\$ 85.4	\$ 113.3	\$ 110.6	\$ 115.5	\$ 122.0	67%	5%
Interest Expense	\$(3.3)	\$(6.7)	\$(6.1)	\$(3.7)	\$(4.5)	\$(8.5)	\$(12.0)	\$(12.0)	\$(10.0)	\$(8.0)		
Pretax Income	\$ 3.3	\$ 12.8	\$ 10.6	\$ 23.2	\$ 13.1	\$ 76.9	\$ 101.3	\$ 98.6	\$ 105.5	\$ 114.0		
Tax Rate	45%	-	45%	44%	44%	46%	46%	46%	46%	46%		
Taxes	\$(1.5)	4.6	(4.8)	(10.1)	(5.7)	35.4	(48.6)	(45.4)	(48.5)	(52.4)		
Net Income	\$ 1.8	\$(22.3)	\$ 5.4	\$ 13.1	\$ 7.7	\$ 41.5	\$ 54.7	\$ 53.2	\$ 57.0	\$ 61.6		
Est'd. Shares Outstanding	6.9	6.9	6.9	7.1	7.6	7.6	15.31	15.3	15.3	15.3	87%	10%
E.P.S. before Extraordinary	\$ 0.24	\$(3.24)	\$ 0.78	\$ 1.83	\$ 1.01	\$ 5.45	\$ 3.60	\$ 3.50	\$ 3.70	\$ 4.05		
Tax Loss Carryforward	-	-	0.54	0.54	-	-	-	-	-	-		
Earnings Per Share	\$ 0.24	\$(3.24)	\$ 1.32	\$ 2.33	\$ 1.01	\$ 5.45	\$ 3.60	\$ 3.50	\$ 3.70	\$ 4.05	87%	10%
Contributions to E.P.S.												
Electronics	\$ 0.11	\$ -	\$ 0.77	\$ 1.73	\$ 0.24	\$ 4.52	\$ 3.03	\$ 2.87	\$ 3.00	\$ 3.24	-	9%
Toys and Games	0.05	-	0.16	0.16	0.14	0.10	0.07	0.09	0.09	0.13	19	16
Ride-On Vehicles	-	-	(0.02)	-	0.22	0.38	0.24	0.25	0.28	0.32	-	15
Swimming Pools	0.08	-	0.40	0.44	0.41	0.45	0.28	0.30	0.33	0.36	44	8
Total	\$ 0.24	\$ -	\$ 1.32	\$ 2.33	\$ 1.01	\$ 5.45	\$ 3.60	\$ 3.50	\$ 3.70	\$ 4.05	118%	10%

1 - Adjusted for two-for-one stock split, effective January 1983.

Source: Corporate reports and Bernstein estimates.

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TABLE 39
Coleco Industries
Electronics/Video Game Revenue and Earnings Forecast

	Units (mil.)	Average Price (\$ mil.)	Revenue (\$ mil.)	Gross Margin	Gross Profit (\$ mil.)	Selling Costs and Allowances	Operating Earnings (\$ mil.)	Operating Margin	% of Division Operating Income	% of Corporate Operating Income
1982E										
Table Top Arcades	2.7	\$ 39	\$105.0	38%	\$ 40.0				31%	26%
ColecoVision Consoles	0.5	150	75.0	30	22.5				17	14
ColecoVision Cartridges	2.0	19	38.0	40	15.2				12	10
Other Cartridges (Mattel/Atari)	6.0	18	108.0	45	48.6				37	31
Other ¹	-	-	15.0	30	4.5				3	2
Total			\$341.0	38%	\$130.8	\$ 60.0	\$ 70.8	20.8%	100%	83%
1983E										
Table Top Arcades	1.0	\$ 39	\$ 39.0	38%	\$ 14.8				8%	6%
ColecoVision Consoles	1.8	130	236.0	28	65.8				34%	29%
ColecoVision Cartridges	5.0	15	75.0	42	31.5				16	13%
Other Cartridges (Mattel/Atari)	10.0	15	150.0	42	63.0				32	27%
Other ¹	-	-	50.0	40	20.0				10	8%
Total			\$550.0	35%	\$195.1	\$100.0	\$ 95.1	17.3%	100%	84%
1984E										
ColecoVision Consoles	1.8	\$105	\$189.0	25%	\$ 47.5				24%	20%
ColecoVision Cartridges	5.0	13	65.0	40	26.0				13	11%
Other Cartridges (Mattel/Atari)	9.0	13	117.0	40	46.8				23	19%
Modules/Keyboards	1.0	80	80.0	35	28.0				14	11%
Other ¹	-	-	150.0	35	52.5				26	21%
Total			\$601.0	33%	\$200.6	\$110.0	\$ 90.8	15.1%	100%	82%
1985E										
ColecoVision Consoles	2.0	\$ 95	\$180.0	25%	\$ 45.0				22%	18%
ColecoVision Cartridges	5.5	12	66.0	37	24.4				12	9%
Other Cartridges	9.0	13	117.0	38	44.4				21	17%
Modules/Keyboards	1.5	75	112.5	27	30.5				15	12%
Other ¹	-	-	200.0	32	64.4				31	25%
Total			\$675.5	31%	\$208.7	\$115.0	\$ 93.7	14.0%	100%	81%
1986E										
ColecoVision Consoles	2.2	\$ 85	\$187.0	25%	\$ 46.7				21%	17%
All Cartridges	15.0	12	180.0	35	63.0				29	23%
Modules/Keyboards	1.5	60	90.0	27	24.5				11	8%
Other ¹	-	-	250.0	33	82.3				38	30%
Total			\$707.0	31%	\$217.5	\$120.0	\$ 97.5	13.8%	100%	80%

1 - Includes hand-held toys, module attachments and other accessories.
Source: Bernstein estimates.

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TABLE 40
Coleco Industries
Quarterly Revenue and Earnings
(\$ millions. Except E.P.S.)

	1980	1981	1982	1983E		1980	1981	1982E	1983E
Sales					% Increase				
1st Qtr.	\$ 40.3	\$ 36.6	\$ 54.7	\$154.0	1st Qtr.	41.4%	(9.2)%	49.5%	181.5%
2nd Qtr.	49.1	57.5	86.8	140.0	2nd Qtr.	33.4	17.3	51.0	61.3
3rd Qtr.	47.3	49.1	165.6	206.5	3rd Qtr.	23.2	3.8	237.3	24.7
4th Qtr.	26.1	35.0	164.6	200.0	4th Qtr.	(20.0)	34.1	370.3	21.4
Total	\$162.9	\$178.0	\$471.7	\$700.5	Total	19.3%	9.3%	165.0%	46.7%
Cost of Sales					% Sales				
1st Qtr.	\$ 25.5	\$ 23.8	\$ 33.2	\$ 87.1	1st Qtr.	63.3%	65.0%	60.7%	56.6%
2nd Qtr.	29.3	36.3	52.4	78.8	2nd Qtr.	59.7	63.1	60.4	56.3
3rd Qtr.	28.2	30.5	79.0	114.2	3rd Qtr.	59.7	62.1	47.7	55.3
4th Qtr.	14.6	24.5	84.2	106.0	4th Qtr.	55.9	70.3	51.2	53.0
Total	\$ 97.6	\$115.2	\$248.8	\$386.1	Total	60.0%	64.7%	52.7%	55.1%
Selling, G&A					% Sales				
1st Qtr.	\$ 8.1	\$ 8.4	\$ 12.4	\$ 42.8	1st Qtr.	20.1%	23.0%	22.7%	27.2%
2nd Qtr.	9.6	12.8	19.1	38.2	2nd Qtr.	19.6	22.3	22.0	27.3
3rd Qtr.	11.6	13.5	51.2	56.1	3rd Qtr.	24.5	27.5	30.9	27.2
4th Qtr.	9.1	10.6	55.5	64.0	4th Qtr.	34.9	30.3	33.7	32.0
Total	\$ 38.4	\$ 45.3	\$137.5	\$201.1	Total	23.6%	25.4%	29.2%	28.7%
Operating Income					Oper. Margin				
1st Qtr.	\$ 6.7	\$ 4.5	\$ 9.2	\$ 24.1	1st Qtr.	16.6%	11.8%	16.8%	15.6%
2nd Qtr.	10.6	8.4	16.0	23.0	2nd Qtr.	21.6	14.6	18.4	16.4
3rd Qtr.	7.5	5.1	35.3	36.2	3rd Qtr.	15.9	10.4	21.3	17.6
4th Qtr.	2.2	(0.4)	24.9	30.0	4th Qtr.	7.8	-	15.1	15.0
Total	\$ 26.9	\$ 17.6	\$ 85.4	\$113.3	Total	16.5%	9.9%	18.1%	16.4%
Interest Expense					% Sales				
1st Qtr.	\$ 1.0	\$ 0.2	\$ 1.0	\$ 1.8	1st Qtr.	2.5%	0.1%	1.8%	1.2%
2nd Qtr.	1.6	1.4	2.2	3.1	2nd Qtr.	3.3	2.4	2.5	2.2
3rd Qtr.	0.9	1.5	2.6	3.5	3rd Qtr.	1.9	3.1	1.6	1.7
4th Qtr.	0.2	1.4	2.7	3.6	4th Qtr.	0.1	4.0	1.6	1.8
Total	\$ 3.7	\$ 4.5	\$ 8.5	\$ 12.0	Total	2.3%	2.5%	1.8%	1.7%
Other Income (expenses)					% Sales				
1st Qtr.	\$ 0.0	\$ 0.1	\$ 0.1	\$ 0.0	1st Qtr.	0.0%	0.0%	0.0%	0.0%
2nd Qtr.	(0.2)	0.4	0.6	0.0	2nd Qtr.	0.0	0.1	0.1	0.0
3rd Qtr.	(0.1)	0.0	0.0	0.0	3rd Qtr.	0.0	0.0	0.0	0.0
4th Qtr.	0.1	0.0	1.0	0.0	4th Qtr.	0.0	0.0	0.2	0.0
Total	\$ (0.2)	\$ 0.4	\$ 1.7	\$ 0.0	Total	0.0%	0.0%	0.4%	0.0%
Pretax Income					Pretax Margin				
1st Qtr.	\$ 5.7	\$ 4.4	\$ 8.3	\$ 22.3	1st Qtr.	14.1%	12.0%	15.2%	14.5%
2nd Qtr.	8.7	7.4	13.6	19.9	2nd Qtr.	17.7	12.9	15.7	14.2
3rd Qtr.	6.5	3.6	32.7	32.7	3rd Qtr.	13.7	7.3	19.7	15.8
4th Qtr.	2.2	(2.0)	22.3	26.4	4th Qtr.	8.4	(5.7)	n.m.	13.2
Total	\$ 23.1	\$ 13.5	\$ 76.9	\$101.3	Total	14.2%	7.6%	16.3%	14.5%
Taxes					Tax Rate				
1st Qtr.	\$ 2.4	\$ 2.1	\$ 3.7	\$ 10.3	1st Qtr.	42.1%	47.7%	44.6%	46.0%
2nd Qtr.	4.0	3.4	6.2	9.2	2nd Qtr.	46.0	45.9	45.6	46.0
3rd Qtr.	2.9	1.6	15.2	15.0	3rd Qtr.	44.6	44.4	46.5	46.0
4th Qtr.	0.8	(1.3)	10.3	12.1	4th Qtr.	36.4	-	46.0	46.0
Total	\$ 10.1	\$ 5.8	\$ 35.4	\$ 46.6	Total	43.7%	43.0%	46.0%	46.0%
Extraordinary Credit					% Sales				
1st Qtr.	\$ 1.8	\$ -	\$ -	\$ -	1st Qtr.	4.5%	-	-	-
2nd Qtr.	1.8	-	-	-	2nd Qtr.	3.7	-	-	-
3rd Qtr.	-	-	-	-	3rd Qtr.	-	-	-	-
4th Qtr.	-	-	-	-	4th Qtr.	-	-	-	-
Total	\$ 3.6	\$ -	\$ -	\$ -	Total	2.2%	-	-	-
Net Income					% Sales				
1st Qtr.	\$ 5.1	\$ 2.4	\$ 4.5	\$ 12.0	1st Qtr.	12.7%	6.6%	8.2%	7.8%
2nd Qtr.	6.5	4.0	7.4	10.7	2nd Qtr.	13.2	7.0	8.5	7.6
3rd Qtr.	3.6	2.0	17.6	17.7	3rd Qtr.	7.6	4.1	10.6	8.6
4th Qtr.	1.4	(0.6)	12.0	14.3	4th Qtr.	5.4	-	7.3	7.2
Total	\$ 16.6	\$ 7.7	\$ 41.5	\$ 54.7	Total	10.2%	4.3%	8.8%	7.8%
Earnings Per Share²					% Increase				
1st Qtr.	\$ 0.371	\$ 0.16	\$ 0.30	\$ 0.79 ²	1st Qtr.	n.m.	(57.5)%	90.3%	167.8% ³
2nd Qtr.	0.451	0.26	0.48	0.71	2nd Qtr.	n.m.	(45.3)	86.5	46.4
3rd Qtr.	0.26	0.13	1.15	1.16	3rd Qtr.	37.8%	(47.1)	748.0	1.3
4th Qtr.	0.10	(0.04)	0.77	0.94	4th Qtr.	(56.8)	n.m.	n.m.	17.5
Total	\$ 1.17	\$ 0.51	\$ 2.70	\$ 3.60 ²	Total	76.5%	(56.3)%	440.0%	32.1% ³

1 - Includes tax loss carryforward of \$0.25 and \$0.27 in 1st and 2nd quarters of 1980, respectively.
2 - Earnings per share reflect two-for-one stock split effective January 1983.
3 - Adjusted for stock split.

Source: Corporate reports and Bernstein estimates.

(3/40, 40A)

BALLY MANUFACTURING CORP.

FINANCIAL PERFORMANCE

TABLE 41
Bally Manufacturing Corp.
Revenue by Product Group
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Annual Compound Growth Rate 1977-82E 1982-86E
Manufacturing - Amusement											
Coin-Op Video	\$ 17.0	\$ 21.5	\$ 80.0	\$ 134.9	\$ 296.3	\$ 388.5	\$ 388.0	\$ 425.0	\$ 448.5	\$ 480.0	95%
Flipper Pinball	68.2	98.8	127.5	93.9	67.8	41.0	38.0	30.0	21.0	22.0	(10)
Other (Incl. Parts)	10.9	16.2	11.5	24.7	27.5	35.0	35.0	40.0	45.0	50.0	26
Sub-Total	\$ 97.4	\$ 136.6	\$ 199.0	\$ 253.5	\$ 391.6	\$ 464.5	\$ 441.0	\$ 495.0	\$ 514.5	\$ 532.0	37%
Manufacturing - Gaming											
Slot Machines	\$ 35.2	\$ 56.5	\$ 45.9	\$ 53.1	\$ 40.2	\$ 35.0	\$ 42.0	\$ 50.0	\$ 57.0	\$ 65.0	NC
In Line Pinball	9.7	11.2	10.2	7.1	0.3	0.6	1.0	1.0	1.5	2.0	(43)
Wall machines	27.3	30.1	32.6	34.0	20.0	22.0	20.0	20.0	20.0	20.0	(4)
Other (Incl. Lottery)	4.3	4.9	8.4	15.0	15.3	30.0	70.0	130.0	220.0	320.0	47
Sub-Total	\$ 76.5	\$ 102.7	\$ 97.1	\$ 109.2	\$ 75.8	\$ 87.6	\$ 133.0	\$ 211.0	\$ 298.0	\$ 417.0	3%
Distribution	\$ 33.3	\$ 36.5	\$ 41.6	\$ 82.8	\$ 134.0	\$ 190.0	\$ 212.5	\$ 235.0	\$ 265.0	\$ 300.0	42%
Amusement Services											
Arcades	\$ 15.6	\$ 19.5	\$ 26.3	\$ 38.3	\$ 64.3	\$ 91.0	\$ 127.5	\$ 148.5	\$ 178.1	\$ 200.0	42%
Restaurants (Tom Foolery)	-	-	2.0	3.1	4.1	3.5	6.0	10.0	12.5	15.0	35
Theme Parks (Six Flags)	-	-	-	-	-	236.7	280.0	310.0	340.0	375.0	44
Other	15.7	11.9	7.4	-	-	-	-	10.0	20.0	30.0	12
Sub-Total	\$ 31.3	\$ 31.4	\$ 35.7	\$ 41.4	\$ 69.6	\$ 331.2	\$ 413.5	\$ 478.5	\$ 550.6	\$ 620.0	80%
Hotel/Casino											
Other	-	-	3.5	208.0	219.0	215.0	245.0	280.0	315.0	350.0	17%
Services Sub-Total	\$ -	\$ -	\$ 39.2	\$ 252.2	\$ 290.5	\$ 546.2	\$ 680.5	\$ 758.5	\$ 868.6	\$ 975.0	-
Other (Licensing Fees, etc.)	\$ 0.8	\$ 7.7	\$ 8.3	\$ -	\$ -	\$ 3.0	\$ 20.0	\$ 50.0	\$ 70.0	\$ 80.0	13%
Corp. Eliminations	(0.8)	-	-	(4.8)	(7.1)	(13.0)	(13.5)	(15.0)	(20.0)	(25.0)	26
Total	\$ 247.1	\$ 315.1	\$ 386.2	\$ 693.2	\$ 884.9	\$ 1,280.3	\$ 1,473.5	\$ 1,734.5	\$ 1,991.6	\$ 2,279.0	15%
Δ Change	-	27%	23%	79%	28%	45%	15%	18%	15%	14%	(11/42)

Source: Corporate reports and Bernstein estimates.

TABLE 42
Bally Manufacturing Corp.
Earnings by Product Group
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Annual Compound Growth Rate 1977-82	1982-86E
Manufacturing - Amusements												
Coin-Op Video	\$ 4.5	\$ 6.0	\$ 17.0	\$ 36.5	\$ 95.0	\$ 120.5	\$ 110.4	\$ 123.5	\$ 125.5	\$ 124.2	93%	1%
Flipper Pinball	15.5	26.0	30.0	19.5	10.2	5.5	4.5	4.0	2.5	2.0	(19)	(22)
Other (Incl. Parts)	1.0	2.5	2.0	3.7	4.1	4.5	5.0	5.2	6.0	6.5	35	10
Sub-Total	\$ 21.0	\$ 34.5	\$ 49.0	\$ 59.5	\$ 109.3	\$ 130.5	\$ 119.9	\$ 132.7	\$ 134.0	\$ 132.7	44%	1%
Manufacturing - Gaming												
Slot Machines	\$ 9.0	\$ 14.3	\$ 12.5	\$ 15.0	\$ 5.5	\$ 5.0	\$ 6.3	\$ 7.5	\$ 9.0	\$ 10.0	(11)%	19%
In-Line Pinball	1.5	2.5	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	NM	NM
Wall Machines	5.0	6.5	3.5	5.0	1.0	2.5	2.0	2.0	2.0	2.0	(13)	(5)
Other (Incl. Lottery)	0.5	0.7	1.0	2.0	1.5	2.5	13.5	25.0	45.0	70.0	36	130
Sub-Total	\$ 16.0	\$ 25.0	\$ 21.0	\$ 23.0	\$ 8.0	\$ 10.0	\$ 21.8	\$ 34.5	\$ 56.0	\$ 82.0	(79)%	69%
Distribution	\$ 3.0	\$ 3.0	\$ 5.0	\$ 10.0	\$ 20.0	\$ 17.5	\$ 21.4	\$ 26.2	\$ 31.3	\$ 32.5	43%	17%
Amusement Services												
Arcades	\$ 4.0	\$ 5.0	\$ 7.5	\$ 11.5	\$ 20.1	\$ 24.3	\$ 32.3	\$ 37.5	\$ 40.0	\$ 41.5	43%	14%
Restaurants	-	-	-	0.1	0.8	0.7	1.2	2.0	2.5	3.0	44	44
Theme Parks (Six Flags)	-	-	-	-	-	5.0	10.0	15.0	24.0	33.8	-	61
Other	3.4	1.0	0.8	-	-	-	-	0.5	4.0	7.0	-	-
Sub-Total	\$ 7.4	\$ 6.0	\$ 8.3	\$ 11.6	\$ 20.9	\$ 30.0	\$ 43.5	\$ 55.0	\$ 70.5	\$ 85.3	43%	30%
Hotel/Casino												
Other	\$ -	\$ -	\$ 0.8	\$ 0.6	\$ 7.1	\$ 20.0	\$ 22.0	\$ 27.5	\$ 31.0	\$ 35.0	-8	150
Services Sub-Total	\$ 9.4	\$ 6.0	\$ 9.1	\$ 18.9	\$ 34.7	\$ 50.5	\$ 66.5	\$ 83.5	\$ 102.5	\$ 121.3	-	24%
Other (Incl. License Fees)												
Eliminations, Corp. Charges	-	-	-	-	(16.0)	(20.0)	(21.0)	(22.0)	(23.5)	(25.0)	-8	111%
Total - Pretax	\$ 38.8	\$ 60.3	\$ 74.1	\$ 102.7	\$ 156.0	\$ 190.5	\$ 218.6	\$ 279.9	\$ 335.3	\$ 383.5	37%	19%
Tax Rate	49%	46%	35%	48%	48%	48%	47%	47%	47%	47%	-	-
Taxes	19.1	27.9	25.6	49.2	74.2	91.6	103.9	131.5	157.6	180.4	-	-
Minority Interest	0.2	0.5	2.1	0.7	0.1	0.6	1.0	2.0	3.0	5.0	-	-
Net Income	\$ 19.5	\$ 31.8	\$ 46.3	\$ 52.8	\$ 81.6	\$ 98.3	\$ 113.7	\$ 146.4	\$ 174.7	\$ 198.1	38%	19%
Average Shares Outstanding	24.1	25.1	27.0	26.8	27.0	30.4	30.4	30.4	30.4	30.4	-	-
Earnings Per Share	\$ 0.81	\$ 1.28	\$ 1.73	\$ 1.97	\$ 3.03	\$ 3.40	\$ 3.75	\$ 4.80	\$ 5.75	\$ 6.50	33%	18%
% Growth	-	58%	35%	14%	54%	12%	10%	28%	20%	13%	-	-

Source: Corporate reports and Bernstein estimates.

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TABLE 43
Bally Manufacturing Corp.
Operating Margins by Product Group

	1977	1978	1979	1980	1981	1982	1983E	1984E	1985E	1986E
Manufacturing - Amusement										
Coin-Op Video	25.3%	27.9%	28.0%	27.1%	32.1%	30.6%	30.0%	28.6%	28.0%	27.0%
Flipper Pinball	22.6	26.3	23.5	20.8	15.0	13.4	11.8	13.3	11.9	9.1
Other (Incl. Parts)	9.2	15.3	17.4	15.0	15.0	12.9	14.3	13.0	13.3	13.0
Sub-Total	21.6%	25.4%	24.5%	23.5%	27.9%	28.1%	27.2%	26.8%	26.0%	24.9%
Manufacturing - Gaming										
Slot Machines	25.6%	25.3%	27.2%	28.0%	13.7%	14.3%	15.0%	15.0%	15.3%	15.4%
In-Line Pinball	15.5	21.7	19.6	14.1	-	-	-	-	-	-
Wall Machines	18.5	21.6	10.7	15.0	5.0	11.1	8.9	10.0	10.0	10.0
Other (Incl. Lottery)	11.6	14.3	11.9	10.0	9.8	8.3	19.3	19.2	20.5	21.2
Sub-Total	20.9%	24.3%	21.6%	27.3%	10.6%	11.4%	16.4%	16.4%	18.8%	19.7%
Distribution	9.1%	8.2%	12.0%	14.0%	15.0%	9.2%	10.1%	11.3%	11.8%	10.8%
Amusement Services										
Arcades	25.6%	25.6%	28.5%	30.0%	31.3%	26.7%	25.3%	25.3%	22.5%	20.8%
Restaurants	-	-	-	3.5	20.1	20.0	20.0	20.0	20.0	20.0
Theme Parks	-	-	-	-	-	2.1	3.6	4.8	7.1	9.0
Other	21.7	8.5	10.8	-	-	-	-	5.0	20.0	23.0
Sub-Total	23.6%	19.1%	23.2%	27.8%	30.0%	13.3%	12.9%	13.6%	13.4%	13.8%
Hotel/Casino	-	-	22.9%	3.2%	3.2%	9.3%	9.0%	9.8%	9.8%	10.0%
Other	-	-	-	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Services Sub-Total	23.6%	19.1%	23.2%	7.5%	12.0%	9.2%	9.8%	11.0%	11.8%	12.4%
Other (Licensing Fees, etc.)	-	-	-	-	-	66.0%	50.0%	50.0%	50.0%	50.0%
Overall Operating Margin	15.7%	19.1%	19.2%	14.8%	17.6%	14.9%	14.9%	16.1%	16.8%	16.8%

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Source: Corporate reports and Bernstein estimates.

TABLE 44
Bally Mfg. Company
Video Game-Related Revenue & Earnings
(\\$ million)

	Units	Average Price/Revenue	Revenue	Operating Margin	Operating Income	Elimination	Corp. Charges and Interest	Contribution to Pretax Income	Corp. In
1980									
Coin-op Video Games (000's)	76.5	\$ 1,765	\$ 134.9	27%	\$ 36.5				
Flipper Pinball (000's)	61.6	1,525	93.9	21	19.5				
Replacement Parts	-	-	24.7	15	3.7				
Distribution	-	-	81.9	15	12.0				
Arcades ¹ (Aladdin's Castle)	308.0	185,100	38.6	22	10.8				
Total			\$ 374.6	22%	\$ 82.5	\$(4.0)	\$(2.8)	\$ 75.7	
1981									
Coin-op Video Games (000's)	145.9	2,030	\$ 296.3	32%	\$ 95.0				
Flipper Pinball (000's)	37.6	1,805	67.9	15	10.2				
Replacement Parts	-	-	27.5	15	4.1				
Distribution	-	-	133.8	15	20.0				
Arcades	250.0	260,000	65.0	31	20.1				
Total			\$ 590.5	25%	\$149.4	\$(6.0)	\$(4.0)	\$139.4	
1982E									
Coin-op Video Games (000's)	185.0	2,100	\$ 388.5	31%	\$120.5				
Flipper Pinball (000's)	22.0	1,850	41.0	13	5.5				
Replacement Parts	-	-	35.0	13	4.5				
Distribution	-	-	190.0	9	17.5				
Arcades	375	345,000	91.0	27	24.3				
Other ²	-	-	3.0	67	2.0				
Total			\$ 748.5	23%	\$174.3	\$(7.0)	\$(6.0)	\$161.3	
1983E									
Coin-op Video Games (000's)	160.0	2,300	\$ 368.0	30%	\$110.4				
Flipper Pinball (000's)	20.0	1,900	38.0	15	4.5				
Replacement Parts	-	-	35.0	14	5.0				
Distribution	-	-	212.5	10	21.4				
Arcades	450	283,000	127.5	25	32.3				
Other	-	-	20.0	50	10.0				
Total			\$ 801.0	23%	\$183.6	\$(8.0)	\$(6.0)	\$169.6	
1984E									
Coin-op Video Games (000's)	165.0	2,575	\$ 425.0	29%	\$123.5				
Flipper Pinball (000's)	15.0	2,000	30.0	13	4.0				
Replacement Parts	-	-	40.0	13	5.2				
Distribution	-	-	235.0	15	26.2				
Arcades	500	300,000	148.5	25	37.5				
Other	-	-	50.0	50	25.0				
Total			\$ 928.5	24%	\$221.4	\$(8.0)	\$(7.0)	\$206.4	
1985E									
Coin-op Video Games (000's)	170.0	2,640	\$ 448.5	28	\$125.5				
Flipper Pinball (000's)	10.0	2,100	21.0	12	2.5				
Replacement Parts	-	-	45.0	13	6.0				
Distribution	-	-	265.0	15	31.3				
Arcades	550	324,000	178.1	25	40.0				
Other	-	-	70.0	80	35.0				
Total			\$1,027.6	23%	\$240.3	\$(9.0)	\$(8.0)	\$223.3	
1986E									
Coin-op Video Games (000's)	170.0	2,750	\$ 460.0	27%	\$134.2				
Flipper Pinball (000's)	10.0	2,200	22.0	9	2.0				
Replacement Parts	-	-	50.0	13	6.5				
Distribution	-	-	300.0	11	32.5				
Arcades	600	333,000	200.0	21	41.5				
Other	-	-	80.0	50	40.0				
Total			\$1,112.0	22%	\$266.7	\$(10.0)	\$(10.0)	\$246.7	

1 - Indicates average number of arcades for year.

2 - Includes license fees for home versions of arcade games, such as joint venture with CBS.

3 - Discrepancies due to rounding.

Source: Corporate reports and Bernstein estimates.

(1/45-454)

TABLE 45
Bally Manufacturing Co.
Quarterly Revenue and Net Income
(\$ million, except E.P.S.)

	1980	1981	1982E	1983E		1980	1981	1982E	1983E
Sales					% Increase				
1st Qtr.	\$153.2	\$211.0	\$ 248.3	\$ 265.0	1st Qtr.	68.9%	37.7%	17.7%	7.1%
2nd Qtr.	179.2	232.4	397.5	452.5	2nd Qtr.	82.6	29.7	71.0	13.8
3rd Qtr.	175.5	224.1	394.5	447.6	3rd Qtr.	87.3	27.7	76.0	13.5
4th Qtr.	185.4	217.4	240.0	308.4	4th Qtr.	92.1	17.3	10.4	28.5
Total	\$693.2	\$884.9	\$1,280.3	\$1,473.5	Total	83.8%	27.7%	44.7%	15.1%
Cost of Sales					% Sales				
1st Qtr.	\$108.2	\$150.5	\$ 176.5	\$ 189.5	1st Qtr.	70.6%	71.3%	71.1%	71.5%
2nd Qtr.	119.3	157.2	281.5	321.3	2nd Qtr.	66.6	67.6	70.8	71.0
3rd Qtr.	114.0	141.0	284.0	317.2	3rd Qtr.	65.0	62.9	72.1	70.9
4th Qtr.	127.8	148.7	173.0	220.5	4th Qtr.	68.9	68.4	72.1	71.5
Total	\$469.4	\$598.1	\$ 915.0	\$1,048.5	Total	67.7%	67.6%	71.5%	71.2%
Selling, G&A					% Sales				
1st Qtr.	\$ 22.4	\$ 23.3	\$ 31.3	\$ 32.8	1st Qtr.	14.6%	11.0%	12.6%	12.4%
2nd Qtr.	21.6	21.3	40.3	48.7	2nd Qtr.	12.1	9.2	10.1	10.8
3rd Qtr.	21.2	27.6	44.2	51.5	3rd Qtr.	12.1	12.3	11.2	11.5
4th Qtr.	23.9	30.8	28.5	38.6	4th Qtr.	12.9	14.2	12.0	12.5
Total	\$ 89.1	\$103.0	\$ 144.3	\$ 171.6	Total	12.9%	11.6%	11.3%	11.6%
Operating Income					Oper. Margin				
1st Qtr.	\$ 22.6	\$ 37.2	\$ 40.5	\$ 42.7	1st Qtr.	14.8%	17.6%	16.3%	16.1%
2nd Qtr.	38.3	53.9	75.7	82.5	2nd Qtr.	21.4	23.2	19.0	18.2
3rd Qtr.	40.3	55.5	66.3	78.9	3rd Qtr.	23.0	24.8	17.0	17.6
4th Qtr.	33.7	37.9	38.5	49.2	4th Qtr.	18.2	17.4	16.0	16.0
Total	\$134.9	\$184.5	\$ 221.0	\$ 253.3	Total	19.5%	20.8%	16.1%	17.2%
Interest Expense					% Sales				
1st Qtr.	\$ 8.3	\$ 8.0	\$ 7.0	\$ 7.5	1st Qtr.	5.4%	3.8%	1.3%	2.8%
2nd Qtr.	10.2	7.8	8.8	9.5	2nd Qtr.	5.7	3.4	2.2	2.1
3rd Qtr.	6.8	6.9	7.7	9.2	3rd Qtr.	3.9	3.1	2.0	2.1
4th Qtr.	6.6	5.1	7.0	8.5	4th Qtr.	3.7	2.3	2.9	2.8
Total	\$ 32.1	\$ 27.8	\$ 30.5	\$ 34.7	Total	4.6%	3.1%	2.1%	2.4%
Taxes					Tax Rate				
1st Qtr.	\$ 6.7	\$ 13.5	\$ 16.3	\$ 16.9	1st Qtr.	47.2%	46.2%	48.7%	48.0%
2nd Qtr.	13.3	23.0	31.4	34.8	2nd Qtr.	47.3	50.0	46.9	47.5
3rd Qtr.	16.0	23.1	29.0	32.9	3rd Qtr.	47.8	46.3	48.8	47.1
4th Qtr.	13.2	14.6	14.9	19.3	4th Qtr.	49.1	44.5	47.3	47.0
Total	\$ 49.3	\$ 74.2	\$ 91.6	\$ 103.9	Total	48.0%	47.6%	48.1%	47.5%
Minority Interests					% Sales				
1st Qtr.	\$ 0.7	\$ 0.5	\$ (0.1)	\$ (0.2)	1st Qtr.	n.m.	n.m.	n.m.	n.m.
2nd Qtr.	(0.4)	(0.2)	(0.3)	(0.3)	2nd Qtr.	n.m.	n.m.	n.m.	n.m.
3rd Qtr.	(1.3)	(0.5)	(0.1)	(0.2)	3rd Qtr.	n.m.	n.m.	n.m.	n.m.
4th Qtr.	0.3	0.1	(0.1)	(0.3)	4th Qtr.	n.m.	n.m.	n.m.	n.m.
Total	\$ (0.7)	\$ (0.1)	\$ (0.6)	\$ (1.0)	Total	n.m.	n.m.	n.m.	n.m.
Net Income					% Sales				
1st Qtr.	\$ 8.1	\$ 16.2	\$ 17.1	\$ 18.1	1st Qtr.	5.3%	7.7%	6.9%	6.9%
2nd Qtr.	14.4	22.9	35.2	37.9	2nd Qtr.	8.0	9.8	8.9	8.4
3rd Qtr.	16.3	24.3	29.5	36.6	3rd Qtr.	9.3	10.8	7.5	8.2
4th Qtr.	14.0	18.3	16.5	21.2	4th Qtr.	7.6	8.4	6.9	6.9
Total	\$ 52.8	\$ 81.7	\$ 98.3	\$ 113.8	Total	7.6%	9.2%	7.7%	7.8%
Earnings Per Share					% Increase				
1st Qtr.	\$ 0.31	\$ 0.60	\$ 0.62	\$ 0.60	1st Qtr.	(20.5)%	93.5%	3.3%	(3.2)%
2nd Qtr.	0.54	0.85	1.21	1.25	2nd Qtr.	22.7	57.4	42.4	3.3
3rd Qtr.	0.60	0.90	1.02	1.20	3rd Qtr.	66.7	50.0	13.3	14.3
4th Qtr.	0.52	0.68	0.55	0.70	4th Qtr.	3.7	30.8	(19.8)	27.3
Total	\$ 1.97	\$ 3.03	\$ 3.40	\$ 3.75	Total	11.4%	53.8%	12.2%	10.3%

n.m. - Not meaningful.

(3/46,46A)

Source Corporate reports and Bernstein estimates.

MATTEL, INC.

FINANCIAL PERFORMANCE

TABLE 46
Mattel, Inc.
Revenue and Earnings Forecast
(\$ million)

	1977	1978	1979	1980	1981	1982E	1983E	1984E	1985E	1986E	Ann. Comp. Growth Rate 1977-1982- 1982-1986E
Operating Revenues											
Toy and Hobby	\$358.1	\$392.2	\$437.3	\$447.1	\$503.5	\$540.5	\$585.0	\$640.0	\$705.0	\$775.0	9%
Electronics	35.0	53.7	92.0	119.3	287.6	324.5	364.0	392.5	428.0	468.0	7%
Publishing and Printing	-	-	200.5	267.5	277.5	236.8	230.0	238.0	245.0	250.0	(3)
Entertainment	43.5	49.6	74.5	81.8	77.3	13.2	12.0	15.0	20.0	25.0	17
Other	-	-	-	-	-	10.0	35.0	40.0	115.0	150.0	98
Intersegment	-	(1.9)	-	-	(12.0)	(5.0)	(7.0)	(10.0)	(15.0)	(20.0)	-
Total	\$436.6	\$493.6	\$805.1	\$915.7	\$1,134.3	\$1,421.0	\$1,519.0	\$1,655.5	\$1,748.0	\$1,880.0	27%
Operating Margins											
Toy and Hobby	12.2%	11.5%	10.2%	9.2%	13.0%	14.5%	14.1%	14.0%	13.5%	13.0%	
Electronics	35.0	35.0	27.8	6.1	25.4	17.7	18.5	13.9	12.7	12.7	
Publishing & Printing	-	-	12.0	7.2	3.8	-	-	2.0	2.0	2.0	
Entertainment	10.6	10.7	5.5	2.8	-	-	-	-	10.0	10.0	
Other	13.9%	14.0%	12.2%	7.7%	13.0%	12.2%	13.0%	20.0	20.0	20.0	
Total											
Operating Income											
Toy and Hobby	\$49.8	\$45.1	\$44.4	\$41.2	\$65.5	\$78.3	\$82.5	\$90.0	\$95.2	\$100.7	12%
Electronics	12.2	18.0	25.8	7.3	73.1	110.5	109.5	96.0	92.0	89.5	55
Publishing and Printing	-	-	23.9	19.4	10.5	(10.7)	-	5.0	7.5	10.0	-
Entertainment	4.6	5.3	4.1	2.4	(1.1)	(4.6)	-	1.0	3.5	3.5	-
Other	\$60.7	\$69.2	\$98.2	\$70.2	\$147.9	\$173.5	\$197.0	\$207.0	\$221.2	\$233.7	-
Total	\$111.0	\$128.0	\$172.2	\$130.0	\$297.0	\$354.7	\$396.0	\$408.0	\$415.9	\$433.4	33%
Interest Expense	(7.7)	(8.8)	(9.9)	(14.4)	(20.7)	(19.0)	(20.0)	(27.0)	(35.0)	(40.0)	(5)
Pre-tax Income	\$41.2	\$47.7	\$61.1	\$115.6	\$176.3	\$235.7	\$276.0	\$281.0	\$280.9	\$293.4	-
Tax Rate	47%	50%	50%	53%	40%	43%	44%	44%	44%	44%	
Taxes	\$19.4	\$23.7	\$30.5	\$8.9	\$36.8	\$46.2	\$56.1	\$52.8	\$51.1	\$52.2	
Net Income	\$21.8	\$23.9	\$30.5	\$7.9	\$39.1	\$61.8	\$70.9	\$67.2	\$65.1	\$66.5	23%
Earnings Per Share											
(fully diluted)	\$1.50	\$1.54	\$1.38	\$0.12	\$1.55	\$2.40	\$2.75	\$2.60	\$2.50	\$2.55	2%
% Change	13%	(11%)	(11%)	(87%)	n/m	55%	15%	(5%)	(4%)	2%	
Per Share Contribution											
Toy and Hobby	\$1.13	\$1.00	\$0.62	\$0.07	\$0.69	\$1.08	\$1.10	\$1.05	\$1.07	\$1.12	
Electronics	0.31	0.42	0.36	0.01	0.77	1.53	1.50	1.12	1.05	0.98	
Publishing and Printing	-	-	0.34	0.03	0.11	(0.15)	0.07	0.08	0.08	0.11	
Entertainment	0.12	0.12	0.06	0.01	0.01	(0.06)	-	0.03	0.03	0.04	
Other	\$1.58	\$1.54	\$1.38	\$0.12	\$1.55	\$2.40	\$2.75	\$2.60	\$2.50	\$2.55	
Total											
Common Share Equivalent											
Outstanding (mln.)	18.7	19.9	23.2	20.1	25.0	26.0	26.0	26.0	26.0	26.0	

1 - Fiscal year ends January 31 of following year.

Source: Corporate reports and Bernstein estimates.

(1/22)

TABLE 47
Mattel, Inc.
Video Game-Related Revenue and Earnings

	Units (mil.)	Average Price	Revenue (\$ mil.)	Gross Margin	Gross Earnings (\$ mil.)	SG&A, Marketing Expenses (\$ mil.)	Contribu- tion to Pretax Income (\$ mil.)	Margin
1980 (FY '81)								
Intellivision Console	0.2	\$ 190	\$ 38.0	30%	\$ 11.4			
Intellivision Cartridges	0.6	20	12.0	50	6.0			
Total			\$ 50.0	35%	\$ 17.4	\$ 9.0	\$ 8.4	16.8%
1981 (FY '82)								
Intellivision Console	1.0	\$ 190	\$190.0	40%	\$ 76.0			
Intellivision Cartridges	4.5	20	90.0	50	54.0			
Total			\$280.0	43%	\$120.0	\$45.0	\$ 75.0	26.8%
1982 (FY '83)								
Intellivision Console	1.0	\$ 165	\$297.0	34%	\$100.0			
Voice Synthesizer	0.2	50	10.0	25	2.5			
Intellivision Cartridges	12.0	18	207.0	45	95.0			
M-Network Cartridges	4.0	17	61.5	35	21.5			
Other			50.0	10	5.0			
Total			\$624.5	36%	\$224.0	\$113.5	\$110.5	17.7%
1983E (FY '84)								
Intellivision Consoles	1.8	\$ 125	\$225.0	27%	\$ 60.5			
Voice Synthesizer	0.4	40	16.0	35	5.5			
Computer Adapter	0.4	100	40.0	40	16.0			
Aquarius Computers	0.1	140	14.0	40	5.5			
Intellivision Cartridges	15.0	15	232.5	40	93.0			
M-Network Cartridges	5.0	15	85.5	40	34.0			
Other (Incl. Software)			50.0	40	20.0			
Total			\$664.0	35%	\$234.5	\$125.0	\$109.5	16.5%
1984E (FY '85)								
Intellivision Consoles	2.1	\$ 95	\$200.0	22%	\$ 44.0			
All Adapters	1.0	70	70.0	30	21.0			
Aquarius Computers	0.3	125	37.5	35	13.0			
Intellivision Cartridges	10.0	13	135.0	38	51.0			
M-Network Cartridge	9.0	13	125.0	38	47.0			
Other (Incl. Software)			125.0	40	50.0			
Total			\$692.5	32%	\$226.0	\$130.0	\$ 96.0	13.9%
1985E (FY '86)								
Intellivision Consoles	1.6	\$ 85	\$136.0	20%	\$ 27.0			
All Adapters	0.5	65	32.5	30	10.0			
Aquarius Computers	0.5	115	57.5	30	17.3			
Intellivision Cartridges	8.0	12	96.0	35	33.7			
M-Network Cartridges	9.5	12	114.0	35	40.0			
Other (Incl. Software)			200.0	35	70.0			
Total			\$678.0	29%	\$198.0	\$125.0	\$ 93.0	13.7%
1986 (FY '87)								
Intellivision Consoles	1.5	\$ 80	\$120.0	20%	\$ 24.0			
All Adapters	0.5	60	30.0	30	9.0			
Aquarius Computers	0.5	110	55.0	25	13.5			
Intellivision Cartridges	6.0	12	75.0	35	26.0			
M-Network Cartridges	10.0	12	120.0	35	42.0			
Other (Incl. Software)			300.0	35	105.0			
Total			\$700.0	31%	\$219.5	\$130.0	\$ 89.5	12.7%

Source: Bernstein estimates.

(1/8K)

TABLE 4B
Mattel, Inc.
Quarterly Revenue and Net Income
(\$ million)

	1980	1981	1982E	1983E		1980	1981	1982E	1983E
Sales					% Increase				
1 Qtr.	\$ 187.4	\$ 191.0	\$ 290.4	\$ 310.0	1 Qtr.	60.2%	1.0%	52.0%	6.7%
2 Qtr.	230.3	259.1	329.7	348.0	2 Qtr.	19.8	12.5	27.2	5.9
3 Qtr.	292.6	373.6	479.7	525.0	3 Qtr.	8.5	27.7	28.4	9.4
4 Qtr.	205.4	310.6	321.2	335.0	4 Qtr.	0.7	51.2	3.4	4.3
Total	\$ 915.7	\$1,134.3	\$1,421.0	\$1,518.0	Total	15.7%	23.6%	25.3%	6.9%
Cost of Sales					% Sales				
1 Qtr.	\$ 118.6	\$ 123.5	\$ 155.6	\$ 172.0	1 Qtr.	63.3%	64.7%	53.6%	55.5%
2 Qtr.	139.5	158.3	175.3	186.7	2 Qtr.	60.6	61.1	53.2	53.5
3 Qtr.	177.6	220.7	277.0	299.3	3 Qtr.	60.7	59.1	57.7	57.0
4 Qtr.	152.9	180.1	183.1	186.9	4 Qtr.	74.4	58.0	57.0	55.8
Total	\$ 588.5	\$ 682.6	\$ 791.0	\$ 844.9	Total	64.3%	60.2%	55.7%	55.6%
Selling & Admin.					% Sales				
1 Qtr.	\$ 55.4	\$ 63.4	\$ 83.5	\$ 102.3	1 Qtr.	31.3%	35.8%	33.6%	33.0%
2 Qtr.	61.4	69.4	106.6	116.8	2 Qtr.	28.1	28.7	33.7	33.5
3 Qtr.	72.1	90.4	131.5	149.5	3 Qtr.	25.7	25.5	27.5	28.5
4 Qtr.	68.1	80.5	124.9	108.5	4 Qtr.	34.7	27.6	35.9	32.4
Total	\$ 257.0	\$ 303.7	\$ 456.5	\$ 477.1	Total	29.5%	28.5%	32.1%	31.4%
Operating Income					Operating Margin				
1 Qtr.	\$ 13.4	\$ 4.1	\$ 41.3	\$ 35.7	1 Qtr.	7.2%	2.1%	14.2%	11.5%
2 Qtr.	29.4	31.4	47.8	45.5	2 Qtr.	12.8	12.1	14.5	13.0
3 Qtr.	42.9	62.4	71.3	76.2	3 Qtr.	14.7	16.6	14.9	14.5
4 Qtr.	(15.6)	50.0	13.2	39.6	4 Qtr.	-	16.2	4.1	12.0
Total	\$ 70.2	\$ 147.9	\$ 173.5	\$ 197.0	Total	7.7%	13.0%	12.2%	13.0%
Interest Expense					% Sales				
1 Qtr.	\$ 7.3	\$ 8.7	\$ 7.7	\$ 8.5	1 Qtr.	3.9%	4.6%	2.7%	2.7%
2 Qtr.	9.6	14.1	13.5	15.0	2 Qtr.	4.2	5.4	4.1	4.3
3 Qtr.	11.5	17.8	15.3	16.5	3 Qtr.	3.9	4.8	3.2	3.1
4 Qtr.	10.6	10.8	10.0	10.0	4 Qtr.	5.2	3.5	3.1	3.0
Total	\$ 39.0	\$ 51.4	\$ 46.5	\$ 50.0	Total	4.3%	4.5%	3.3%	3.3%
Corporate Expense					% Sales				
1 Qtr.	\$ 3.1	\$ 3.8	\$ 4.6	\$ 4.5	1 Qtr.	1.7%	2.0%	1.6%	1.5%
2 Qtr.	4.0	4.7	4.3	5.0	2 Qtr.	1.7	1.8	1.5	1.4
3 Qtr.	4.0	5.0	4.5	4.5	3 Qtr.	1.4	1.3	0.9	0.9
4 Qtr.	3.3	7.2	5.6	6.0	4 Qtr.	1.6	2.3	1.7	1.8
Total	\$ 14.4	\$ 20.7	\$ 19.0	\$ 20.0	Total	1.6%	1.8%	1.3%	1.3%
Taxes					Tax Rate				
1 Qtr.	\$ 1.5	\$ (4.2)	\$ 11.9	\$ 10.0	1 Qtr.	49.1%	-	41.0%	44.0%
2 Qtr.	7.8	6.3	12.4	11.2	2 Qtr.	49.4	50.0	42.0	44.0
3 Qtr.	13.6	19.4	23.1	24.3	3 Qtr.	49.6	48.8	44.9	44.0
4 Qtr.	(13.9)	15.3	(1.2)	10.6	4 Qtr.	-	47.9	-	44.0
Total	\$ 8.9	\$ 36.8	\$ 46.2	\$ 56.1	Total	53.0%	48.5%	43.0%	44.0%
Net Income					% Sales				
1 Qtr.	\$ 1.5	\$ (4.2)	\$ 17.1	\$ 12.7	1 Qtr.	0.8%	-	5.9%	4.1%
2 Qtr.	8.0	6.3	17.1	14.3	2 Qtr.	3.5	2.4	5.2	4.1
3 Qtr.	13.8	20.3	28.3	30.9	3 Qtr.	4.7	5.4	5.9	4.6
4 Qtr.	(15.5)	16.7	(1.2)	13.0	4 Qtr.	-	5.4	-	3.9
Total	\$ 7.9	\$ 39.1	\$ 61.8	\$ 70.9	Total	0.9%	3.4%	4.3%	4.7%
E.P.S. (fully diluted)					% Increase				
1 Qtr.	\$ 0.00	\$ (0.35)	\$ 0.67	\$ 0.50	1 Qtr.	-	-	-	(24.2)%
2 Qtr.	0.32	0.25	0.67	0.55	2 Qtr.	28.0	21.9	168.0	(17.9)
3 Qtr.	0.55	0.82	1.09	1.20	3 Qtr.	(15.4)	49.1	32.9	10.1
4 Qtr.	(1.04)	0.66	(0.04)	0.50	4 Qtr.	-	-	-	-
Total	\$ 0.12	\$ 1.55	\$ 2.40	\$ 2.75	Total	(80.6)%	N.M.	54.8%	14.6%

1 - Quarterly earnings are stated as reported. Full year E.P.S. reflects conversion of warrants.

(1/49-49A)

Source: Corporate reports and Bernstein estimates.

